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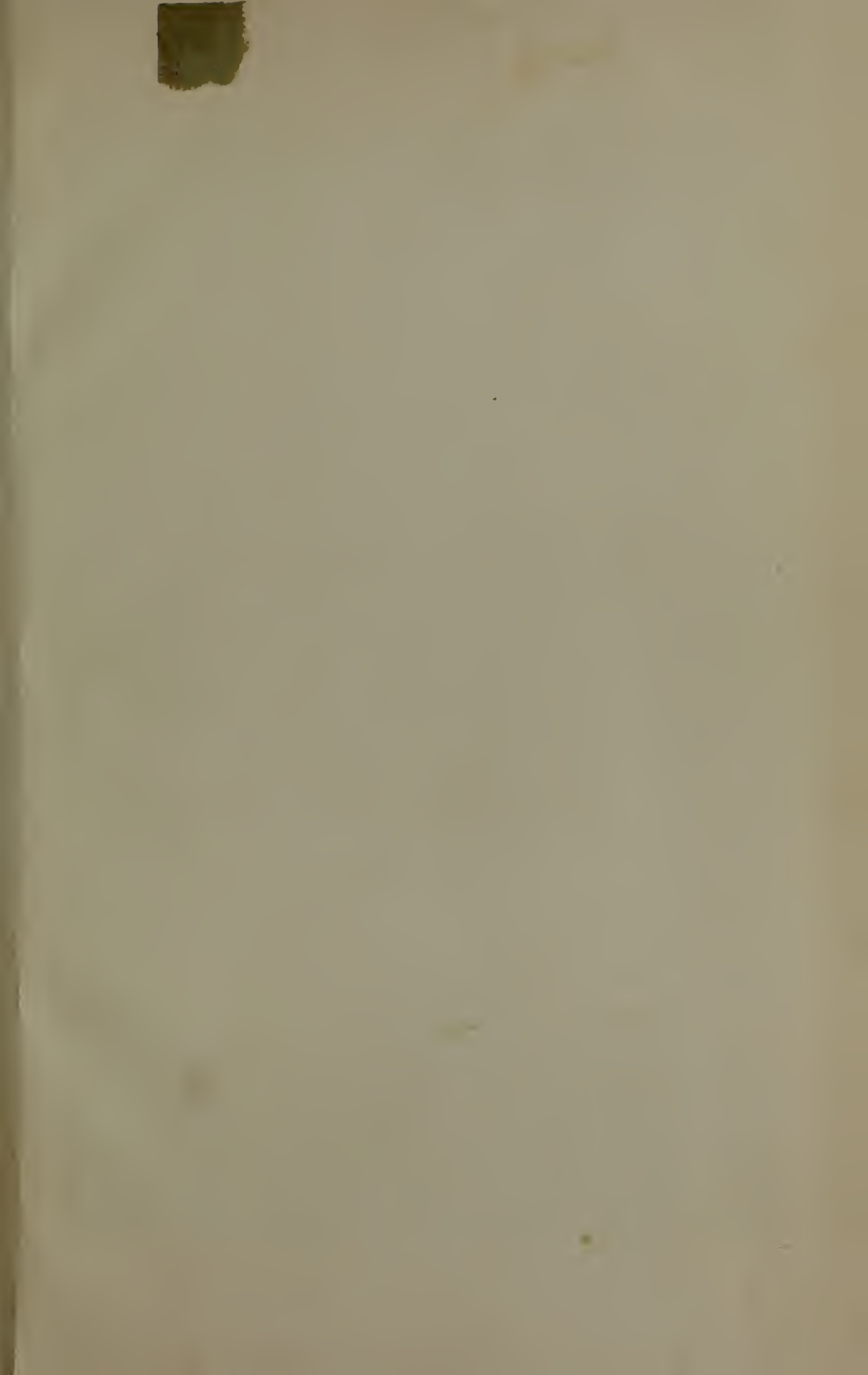














SOUTHWICK HALL

FALMOUTH STREET BUILDING

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SERIES 8, No. 4

May, 1905

BULLETIN

OF THE

Lowell Textile School

LOWELL, MASS.

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*Issued Quarterly*

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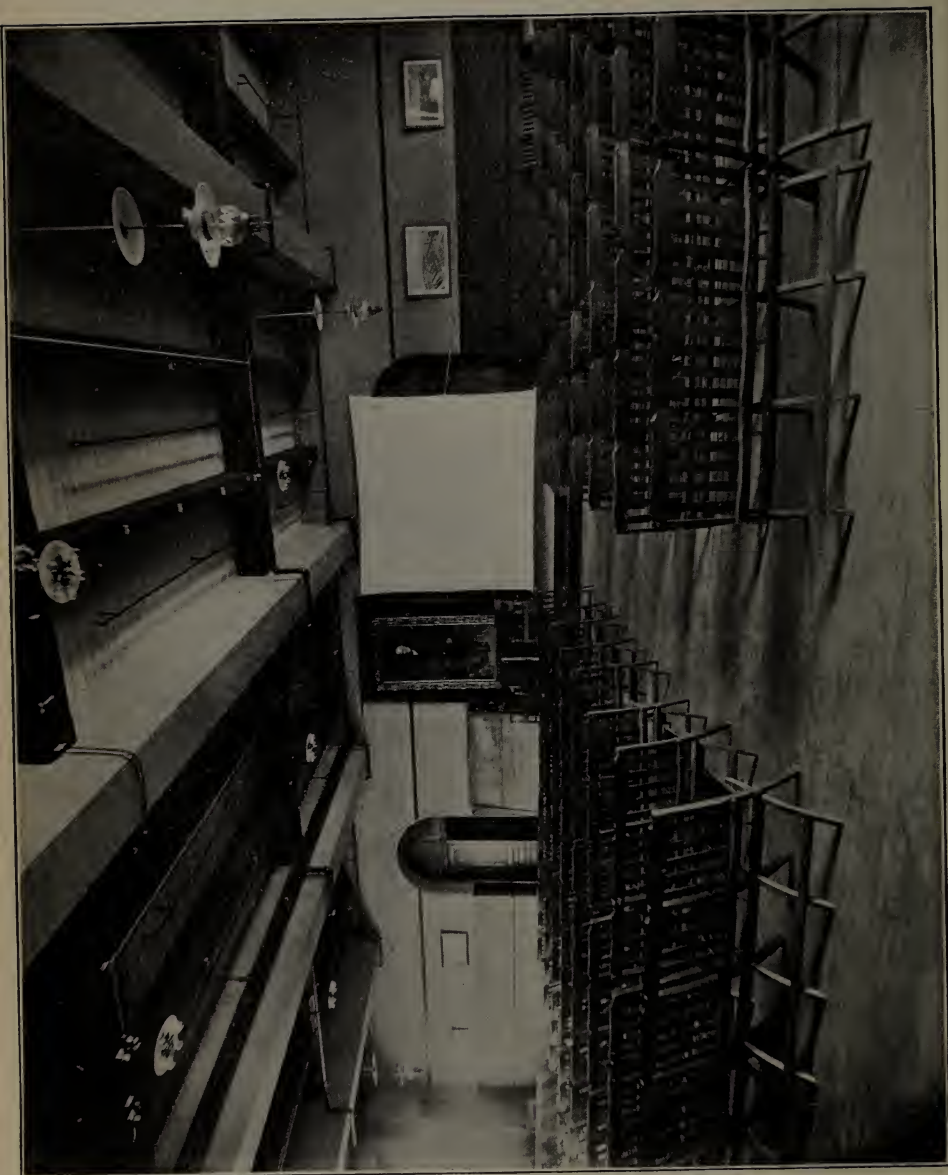
1908  
1905 - 1906

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Entered August 26, 1902, at Lowell, Mass., as second class matter,  
under Act of Congress of July 16, 1894.

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*Moody Street and Colonial Avenue*





## ADDENDA

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### **Additional Trustees Elected by Alumni Under Act of 1905**

For Two Years, from July 1, 1905:

HENRY A. BODWELL, Class of 1900, Assistant Superintendent Smith & Dove  
Manufacturing Co., Andover, Mass.

For One Year, from July 1, 1905:

PAUL T. WISE, Class of 1901, Superintendent Brookside Mills, West Chelms-  
ford, Mass.



## General Committees

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### *FINANCE*

A. G. CUMNOCK, Chairman	A. G. POLLARD	ALVIN S. LYON
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### *BUILDING AND LEGISLATIVE*

A. G. CUMNOCK, Chairman	A. S. COVEL	FRANKLIN W. HOBBS
FREDERIC S. CLARK	ALVIN S. LYON	JACOB ROGERS
FRANK E. DUNBAR	A. G. POLLARD	JAMES T. SMITH

### *WAYS AND MEANS*

JAMES T. SMITH, Chairman	A. S. COVEL	FRANKLIN W. HOBBS
FREDERIC S. CLARK	WALTER E. PARKER	

### *DEPARTMENT COMMITTEES*

#### *Cotton Spinning*

FRANKLIN NOURSE, Chairman	CHARLES L. HILDRETH
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#### *Woolen and Worsted Spinning*

FRANKLIN W. HOBBS, Chairman	FREDERIC S. CLARK
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#### *Weaving*

ALVIN S. LYON, Chairman	WALTER E. PARKER
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#### *Chemistry and Dyeing*

THOMAS WALSH, Chairman	EUGENE S. HYLAN
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#### *Decorative Art*

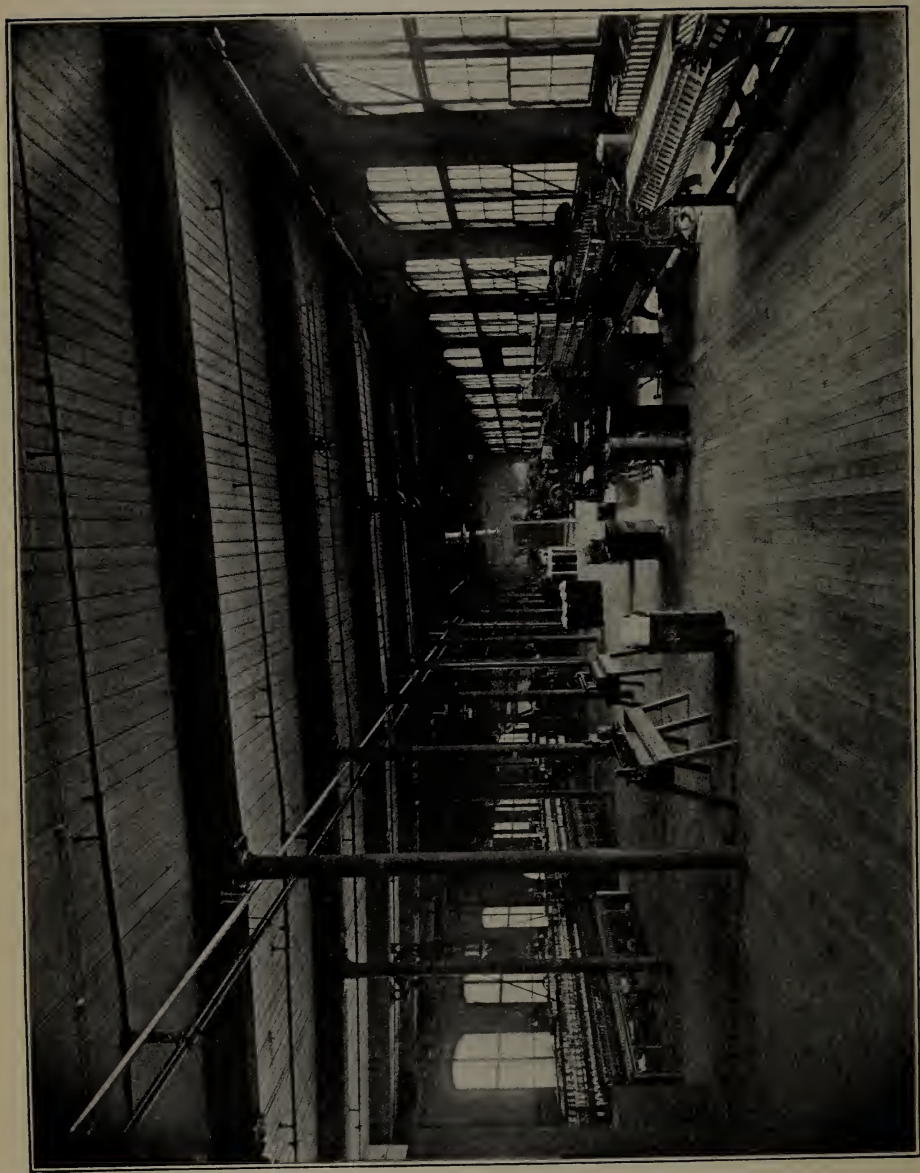
JAMES T. SMITH, Chairman	FREDERICK LAWTON
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#### *Designing and Finishing*

FREDERICK S. CLARK, Chairman	GEORGE E. KUNHARDT
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#### *Mechanical and Electrical Engineering*

HAVEN C. PERHAM, Chairman	ALVIN S. LYON
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COTTON YARN DEPARTMENT

## Officers of Instruction

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Principal of the School and Professor of Mechanical Engineering  
WILLIAM W. CROSBY, S. B., M. E.

Secretary and Instructor in Electrical Engineering  
CHARLES H. EAMES, S. B.

Professor of Textile Design and Fabric Structure  
FENWICK UMPLEBY

Professor of Chemistry and Dyeing  
LOUIS A. OLNEY, A. C.

Head Instructor in Warp Preparation and Weaving  
WILLIAM NELSON

Professor of Decorative Art  
VESPER L. GEORGE

Head Instructor in Woolen and Worsted Spinning  
EDGAR H. BARKER

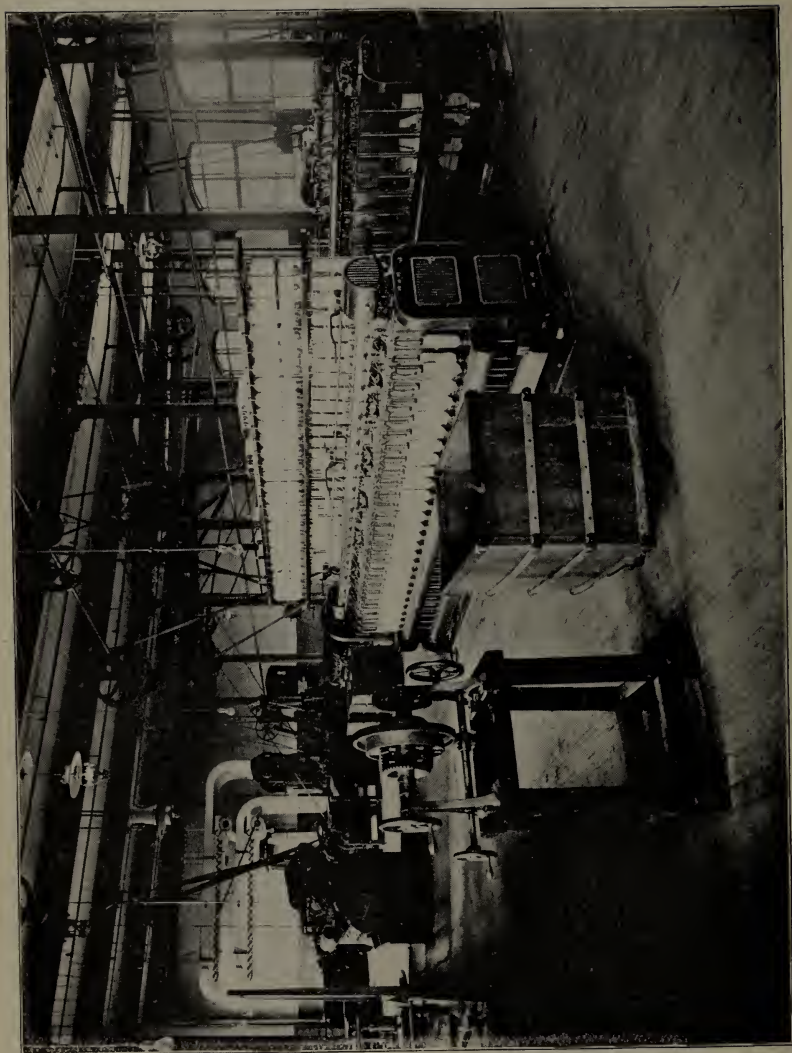
Head Instructor in Cotton Spinning  
STEPHEN E. SMITH

Instructor in Chemistry  
G. CARL SPENCER, S. B.

Instructor in Mechanical Engineering  
GEORGE H. PERKINS, S. B.

Instructor in Finishing and Woolen and Worsted Spinning  
ARTHUR A. STEWART

Instructor in Chemistry  
MILES R. MOFFATT, S. B.



COTTON YARN DEPARTMENT  
FLY FRAMES

Instructor in Free Hand Drawing

IDA A. WOODIES

Instructors in Dyeing

HERBERT F. SCHWARZ

H. A. MATTESON, A. B.

Instructors in Power Weaving

EDWARD NELSON

JOSEPH WILMOT

Instructor in Cotton Spinning

ARTHUR L. WILLEY

Instructor in Textile Design

ARTHUR F. FERGUSON

Instructor in Woolen and Worsted Spinning

FRANK W. EMERSON

Instructor in Hand Loom Department

EVERETT A. JONES

Modern Languages in charge of

PAUL E. KUNZER, PH. D.

## Faculty

WILLIAM W. CROSBY

E. H. BARKER

FENWICK UMPLEBY

G. H. PERKINS

L. A. OLNEY

S. E. SMITH

WILLIAM NELSON

ARTHUR STEWART

V. L. GEORGE

C. H. EAMES





COTTON YARN DEPARTMENT



# CALENDAR

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## 1905

Entrance examinations for day students, Thursday, Sept. 14, at 10 a. m.

Examinations for advanced standing, Thursday, Sept. 21, at 10 a. m.

Entrance examinations for evening students, Thursday, Sept. 21, at 7 p.m.

(For additional examinations for evening classes, see announcement.)

Day School year begins Tuesday, Sept. 26.

Evening school year begins Monday, October 16.

Thanksgiving recess, Thursday, Nov. 23 to Saturday, Nov. 25, inclusive.

Christmas recess, Friday, Dec. 22, to Tuesday, Jan. 2, 1905, inclusive.

## 1906

Semi-annual examinations begin Wednesday, January 17.

Second term begins Monday, January 29.

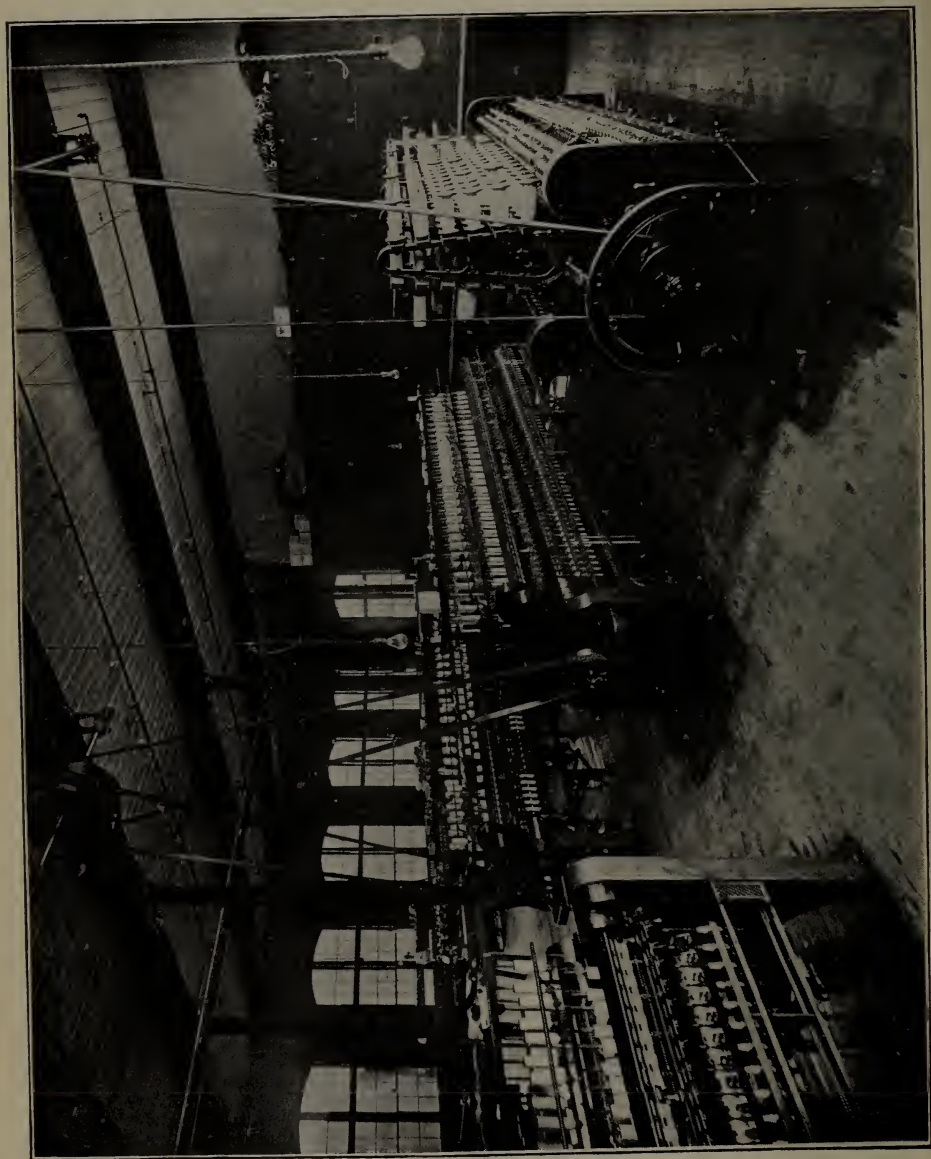
Annual examinations begin Tuesday, May 15.

Diplomas awarded Thursday, May 31.

First entrance examinations Friday, June 1, at 10 a.m.

Second entrance examinations, Thursday, June 14.

There will be no sessions of the school on Washington's birthday or on Patriots' Day.



# The Lowell Textile School

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The Lowell Textile School has been established to provide thorough instruction in the theory and practical arts pertaining to the conversion of all commercial fibres into fabrics.

The school was proposed in the year 1891 but was not opened until several years later. A careful study was made of the foreign schools where the principle had been developed for many years, and as the schools were of established reputation, such portion of their methods as was capable of adaptation was made use of in this school.

The Commonwealth of Massachusetts incorporated the "Trustees of the Lowell Textile School for the purpose of maintaining a textile school for instruction in the theory and practical art of textile and kindred branches of industry." According to the terms of the by-laws at least three-fourths of the board of trustees must be "persons actually engaged in or connected with textile or kindred manufactures." The trustees are mainly representatives of the great textile corporations of Lowell, Lawrence, and vicinity in the Merrimack Valley. The aggregate capital of these corporations amounts to over \$70,000,000.

Lowell, Massachusetts, is called the "Mother Textile City of America," and in locating the school at this center a considerable advantage is maintained for the reason that every commercial fibre enters into the products of the great Merrimack Valley Textile district. The practical work of the school is therefore kept closely in touch with the several branches of the industry which are included in the courses of study.

His Excellency, Governor Roger Wolcott, formally opened the school on January 30, 1897, there being present a large and representative gathering of gentlemen from the textile industries in all portions of New England. The regular classes of the school were opened on February 1, 1897, and have been regularly conducted since that time.

His Excellency, Governor John L. Bates, dedicated the buildings forming the permanent home of the school on February 12, 1903,



WOOLEN AND WORSTED YARN DEPARTMENT

in the presence of a large number of guests representing the Legislature as well as the educational, textile commercial interests of the Commonwealth.

It is found as time goes on that the graduates of the school must be equipped more thoroughly, and it now seems advisable that all students should enter the Lowell Textile School with a preparatory training which is the equivalent of that afforded by the regular four year course of a standard high school. Even in such cases it is necessary to include in the curriculum of this school the branches of General Chemistry, Decorative Art, and Mechanics. These subjects must be taught in a most thorough manner, for upon them depends all the future knowledge pertaining to the great textile industries. It is not the object of the school to train these graduates for professional and scientific work but the principles of science and art are taught with the particular view to their application in industrial and commercial problems. There are many courses, however, which are interesting and profitable to graduates of universities and scientific institutions, and special facilities are offered to those who wish to take up special work at this school.

The mechanical equipment of the school includes the best makes of textile machinery and these machines, while built as they would be for regular work, are, so far as possible adapted to the experimental work which is of particular value in such an institution as this.

There is a more varied equipment in this school than in any other, either in America or Europe, and it is now possible to convert the raw stock into the finished fabric, within the school.

The growth of the school has been a constant one as is evident from the fact that when it was opened February 1, 1897, there were 32 day and 110 evening pupils. January 1, 1905, the roster showed 141 day pupils and 588 evening pupils.

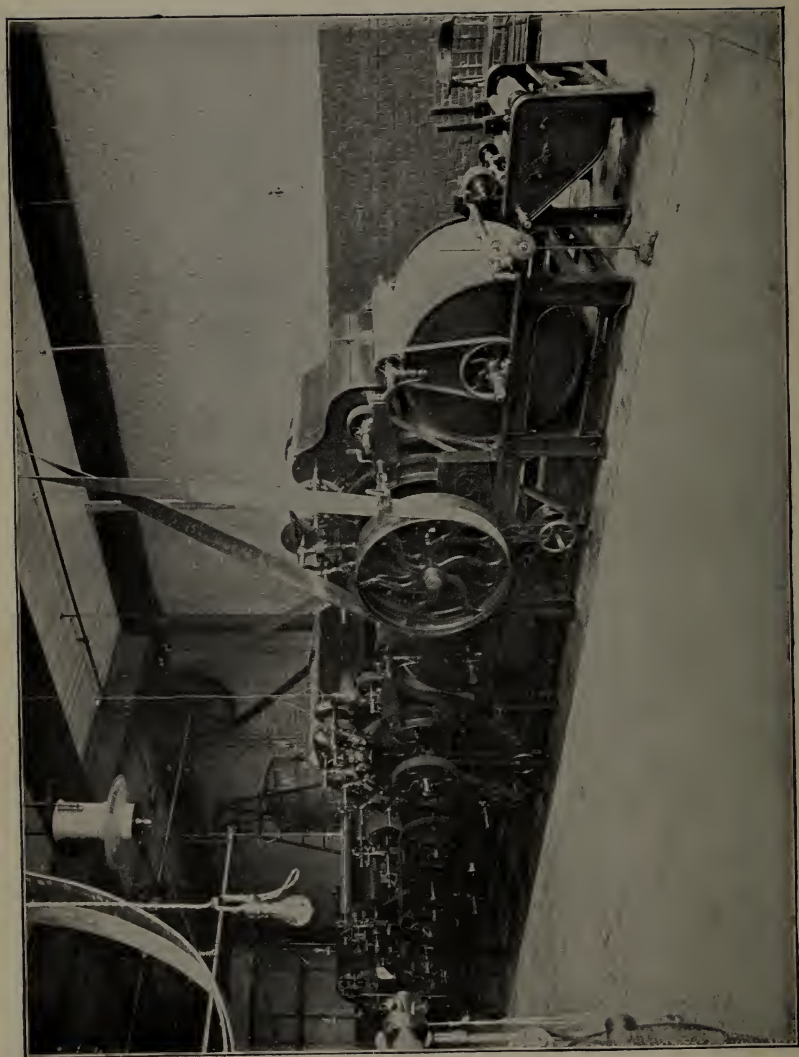
The August bulletin of this year will be devoted to the details of the new equipment and methods of instruction.

### **The Permanent Home**

On January 1st, 1903, the School was transferred from the rented quarters that it had occupied for five years, to the site and buildings where it is permanently located.

The site is a commanding one, consisting of ten acres at a high elevation, on the west bank of the Merrimack River, extending to and overlooking the rapids of Pawtucket Falls, the first to be utilized for





WOOLEN AND WORSTED YARN DEPARTMENT

power weaving in America on an extensive scale. The site was contributed by Frederic Fanning Ayer, Esq., of New York City, and the Proprietors of the Locks and Canals on the Merrimack River. The buildings consist of Southwick Hall, Kitson Hall and one on Falmouth Street not yet named.

Southwick Hall includes a central mass 90 x 90 ft. having three stories and the wings 80 x 85 ft. with two stories and a well lighted basement. The building is pierced in the centre by an arched way from which access is had to the wings and to the central courtyard.

Kitson Hall makes a right angle with Southwick Hall and is 60 x 252 ft. with one story and a basement. It is occupied by the Cotton Yarn Department and heating, lighting, ventilating and power plant.

Falmouth Street Building forms the third side of the quadrangle and consists of two portions, one 75 x 130 ft., two stories, and the head house 70 x 80 ft., three stories and basement. This building is occupied by the departments of weaving and wool yarns. The head house provides for an extension of these departments, for wool scouring, carbonizing, conditioning, etc., and for knitting.

The buildings are all faced with light brick with granite and Indiana lime stone trimmings and are of modern mill construction adapted to educational uses. The floor space of the School is quadrupled in the new home permitting of a very large increase in equipment and is now occupied by the several departments as follows:

Cotton Spinning,	14,000 sq. ft.
Woolen and Worsted Spinning,	20,700 " "
Decorative Art and Textile Design,	14,000 " "
General Chemistry and Dyeing Laboratories,	14,000 " "
Dye House,	6,000 " "
Finishing Room,	5,000 " "
Power Weaving,	15,600 " "
Knitting,	5,600 " "
Mechanical and Electrical Engineering,	8,600 " "

Southwick Hall was contributed by the Commonwealth of Massachusetts and Frederic Fanning Ayer, Esquire, of New York City, and is a memorial to Royal Southwick, a leading textile manufacturer, a public man of earlier days, and a maternal ancestor of Mr. Ayer.

Kitson Hall, dedicated to the memory of Richard Kitson, was contributed by Charlotte P. Kitson and Emma K. Stott, his daughters; the Kitson Machine Company of Lowell, founded by him, was also a generous contributor.



WORSTED COMB



## Day Classes

These are especially intended for the instruction of those whose intention it is to enter the business of textile manufacturing in any branch. The courses are sufficiently complete to enable one to start without any previous acquaintance with textiles; but at the same time those who have been engaged in such business and wish to improve their knowledge and experience, can devote their entire time to study most profitably.

Each course is intended to cover three years. It is optional whether or not a student continues the full course of three years, but this is strongly recommended.

There is one term of preliminary instruction, which is common to all courses. At the end of this term, each student is required to select which of the courses he is to follow in his subsequent studies, and the instruction to be given after the first term of the first year is specialized to suit each course.

The five regular diploma courses are:

- I. Cotton Manufacturing.
- II. Wool Manufacturing.
- III. Designing. General Course.
- IV. Chemistry and Dyeing.
- VI. Textile Engineering.

## Evening Classes

It is intended to give evening instruction to those who are engaged during the day in mills and work shops, to enable them to perfect their knowledge of the branches in which they work, to acquire knowledge of other processes than those in which they are regularly engaged, and to complete in the course of several winters, a thorough technical education without interfering with their daily duties.

Evening students have the option of entering for one or more of six different courses, and arrangements will be made as far as possible for them to take such a section of each course as is suited to the student's daily occupation in the mill.

- I. Cotton Spinning.
- II. (a) Woolen Spinning. (b) Worsted Spinning.
- III. Designing.
- IV. Chemistry and Dyeing.
- V. Weaving.
- VI. Mechanics and Electricity.



WOOLEN AND WORSTED

Course IV requires four years, course III, three years; courses I, IIb, V and VI two years each; course IIa, one year.

For the satisfactory completion of either of these courses, the certificate of the school will be awarded; the diploma of the school will be awarded in exchange for certificates of satisfactory completion of those subjects which go to make up any one of the several regular diploma courses.

In general it is possible to take up the study of two of the above evening courses concurrently.

### **Women's Department**

Among the many fields in which woman has entered, none has been found in which her natural refinement of taste and skill can be used to better advantage than in designing; but natural ability, though the prime requisite is by no means all, for a certain amount of technical knowledge must be gained to achieve success. This department combines decorative art and textile design, and in general requires attendance on four afternoons per week; the studio is open throughout the week however, and an instructor is in attendance.

### **Commercial Department**

A special course in textile construction and foreign languages is arranged for those contemplating a commercial career.

All such are invited to communicate with the Principal, since there is demanded in such a course a greater variety of combinations of studies than in the manufacturing courses.

### **Equipments**

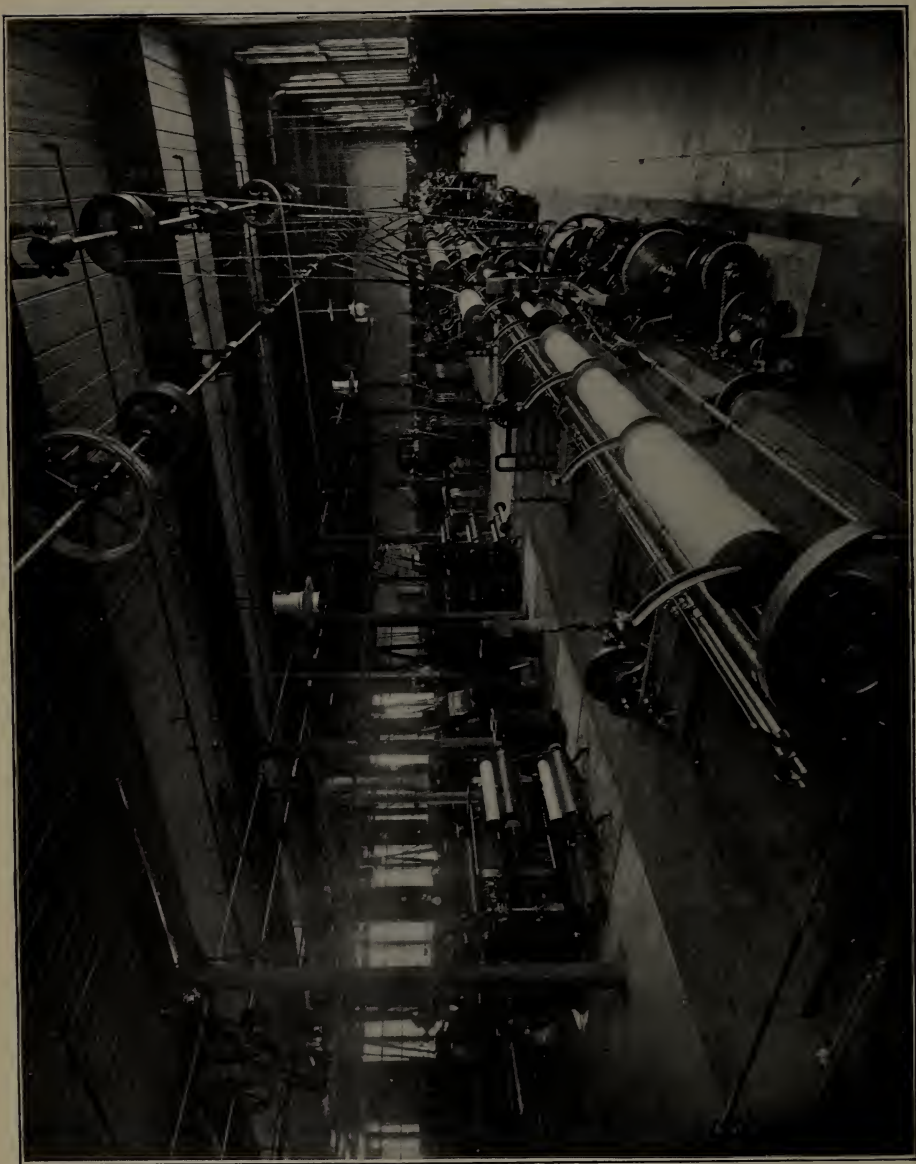
The equipment of machinery, inventoried January 1, 1905, at \$146,628.57, is the most varied in the world for textile educational purposes, and is being constantly augmented. The entire plant, including grounds, buildings and equipment is valued at \$466,848.86.

#### **The Equipment of the Cotton Spinning Department Includes:**

One outfit of Kitson Picking Machinery from works of Kitson Machine Co., Lowell, Mass., as follows:

One Number Seven Opener with Automatic Feeder connected by Robinson Patent Cleaning Trunk to

One 40 in. Single Beater Breaker Lapper with Condenser and Guage Box Feed.



One 40 in. Single Beater Intermediate Finisher Lapper with Perham and Davis Sectional Plate Evener, apron to double four laps.

One 40 in. Single Beater Finisher Lapper with Perham & Davis Sectional Plate Evener, apron to double four laps, Kirschner Pat. Carding Beater.

One Roving Waste Opener.

One Thread Extractor.

Card Grinding Rolls, Stripping Rolls, etc.

One Sliver Lap Machine, made by the Mason Machine Works, Taunton, Mass.

One Comb, made by the Mason Machine Works, Taunton, Mass.

The following machinery from the Lowell Machine Shop, Lowell, Mass.:

One Top Flat Card.

Three Revolving Flat Cards.

Two Railway Heads.

Two Drawing Frames.

One Slubber.

One Intermediate.

One Fine Frame.

One Jack Frame.

Three Ring Spinning Frames.

One Spinning Mule.

One Spooler.

Wet and Dry Twister.

One Reel.

One 50 Saw Gin, built by Daniel Pratt Gin Co., Prattville, Ala.

One Prior Roller Gin.

One Weeks Banding Machine. (Draper Co.)

From the Whitin Machine Works, Whitinsville, Mass.

One 40 in. R. F. Card.

One Six Head Comber.

One Ribbon Lapper.

Two Ring Spinning Frames.

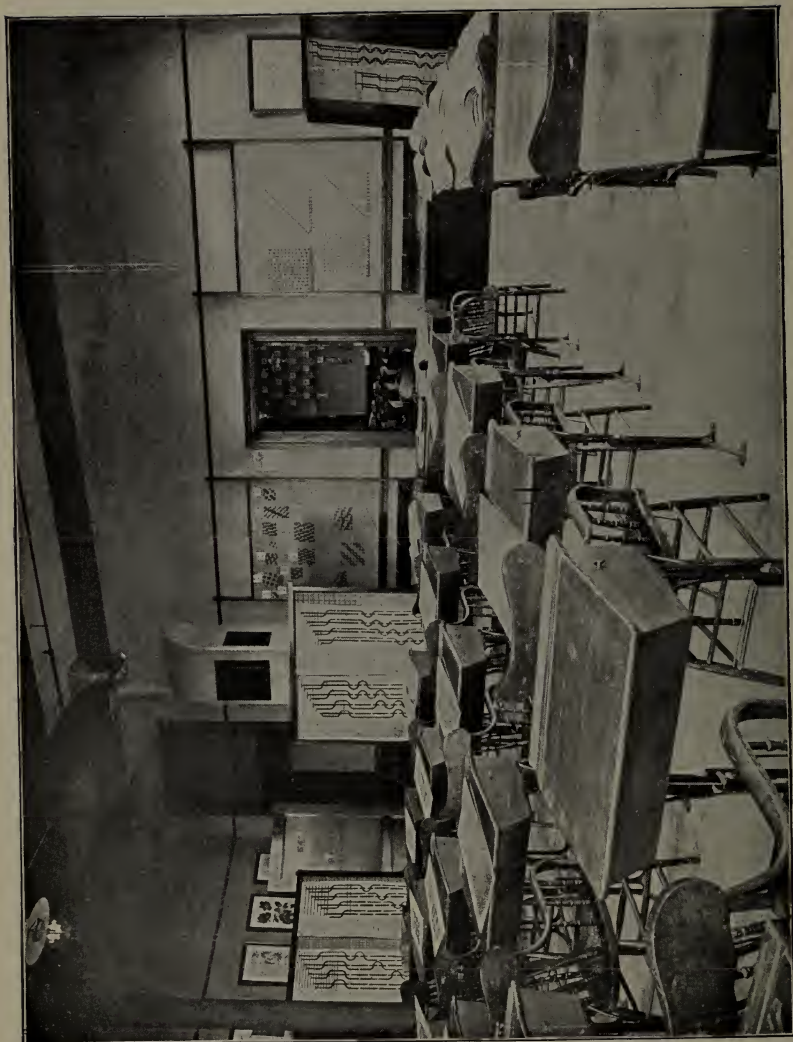
### Knitting Department.

One Mayo Automatic Seamless Knitting Machine.

One Latch Needle Ribbed Cuff Machine, McMichael & Wildman.

One Beattie Looper.





TEXTILE DESIGN DEPARTMENT

Two Invincible Automatic Knitting Machines from the E. Jenckes Mfg. Co., Pawtucket, R. I.

The Head House provides space for a complete knitting equipment.

### **The Woolen Spinning Department Includes:**

Wool Scouring Machinery made by C. G. Sargent's Sons, Graniteville, Mass., consisting of:

One Automatic Feeder for Scouring Bowls.

Two Scouring Bowls, 17 ft. x 24 in.

One Automatic Feeder for Dryer.

One Single Apron Dryer.

One Schaum & Uhlinger Hydro Extractor.

One Parkhurst Burr Picker, made by the Atlas Mfg. Co., Newark, N. J.

One Mixing Picker, made by the Davis & Furber Machine Co., North Andover, Mass., equipped with Improved Mixing Picker Feed, and Spencer Oiler, both made by George S. Harwood & Son, Boston, Mass.

One set of Woolen Cards, including:

First Breaker, Second Breaker and Finisher, made by the Davis & Furber Machine Co., North Andover, Mass.; this set of cards is equipped with Bramwell First Breaker Feed, made by George S. Harwood & Son, Boston, Mass.; Torrance Balling Head and Creel, (made by the Torrance Mfg. Co., Harrison, N. J.) between First Breaker and Second Breaker; Apperly Feed, (made by George S. Harwood & Son, Boston, Mass.,) between Second Breaker and Finisher, and Combination Rub Rolls and Apron Condenser, (made by the Davis & Furber Machine Co., North Andover, Mass.,) on Finisher. These cards are for medium and coarse work.

One set of Davis & Furber Woolen Cards, including:

First Breaker, Second Breaker and Finisher. This set of cards is equipped with Bramwell First Breaker Feed, (made by George S. Harwood & Son, Boston, Mass.;) Apperly Feed with Kemp Traveller, (made by George S. Harwood & Son, Boston, Mass.,) between First Breaker and Second Breaker; Bates Feed, (made by E. V. Bates, Lowell, Mass.,) between Second Breaker and Finisher, and Davis & Furber Double Apron Condenser, on Finisher. These cards are for fine work.



FABRIC STRUCTURE AND  
CLOTH ANALYSIS



One Spinning Mule, 120 spindles, made by the Davis & Furber Machine Co., North Andover, Mass.; Bobbin Holders, supplied by American Bobbin Holder Co., W. Medway, Mass.

One Spinning Mule, 120 Spindles, made by Johnson & Bassett, Worcester, Mass.; Bobbin Holders supplied by Murdock & Geb, Franklin, Mass.

One Woolen Twister, 20 Spindles, made by the Davis & Furber Machine Co., North Andover, Mass.

One Roy Grinding Frame, made by B. S. Roy & Son, Worcester, Mass.

Two Roy Traverse Grinders, made by B. S. Roy & Son, Worcester, Mass.

One Entwistle Traverse Grinder, made by T. C. Entwistle Co., Lowell, Mass.

One Sample Mixing Card, made by the Torrance Mfg. Co., Harrison, N. J.

One Complete Set of Carders' Tools, made by W. H. Brown, Worcester, Mass.

#### **The Worsted Spinning Department Includes:**

One 50-inch Double-Worsted Card (4 liekerin), made by the Davis & Furber Machine Co., North Andover, Mass.

Bramwell Feed, made by George S. Harwood & Son, Boston, Mass.

One Doubling Balling Head Gill Box (with double screws) made by Lowell Machine Shop, Lowell, Mass.

One Weigh Gill Box and Creel, made by Lowell Machine Shop, Lowell, Mass.

One Baller, (punch) made by Crompton & Knowles, Worcester, Mass.

One Noble Worsted Comb, made by Crompton & Knowles, Worcester, Mass.

One Finishing Can Gill Box, made by Hall & Stell, Keighley, England.

One Finishing Balling Head Gill Box, made by Hall & Stell, Keighley, England.

The following Drawing, Spinning and Twisting Machinery from Prince Smith & Son, Keighley, England:

One Revolving Creel for 12 Balls.

One Double Head Can Gill Box.

One 2 Spindle Gill Box.



STUDIO  
DECORATIVE ART DEPARTMENT

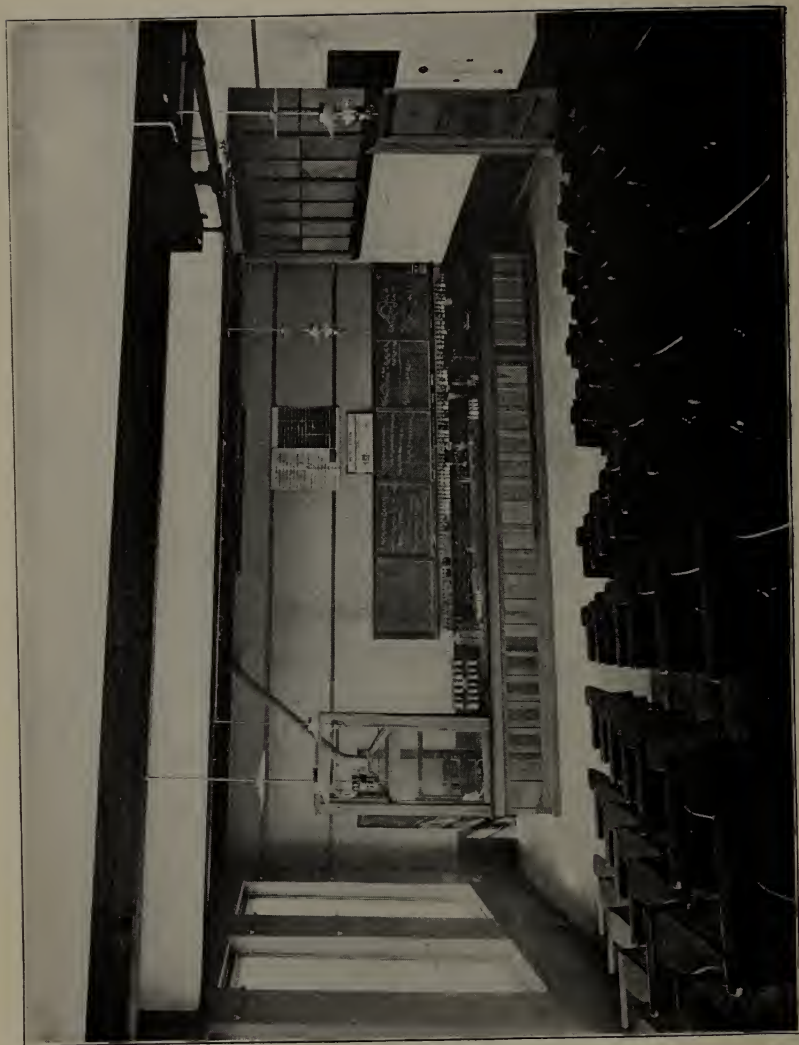
- One 2 Spindle Drawing Box.
- One 2 Spindle Weigh Box.
- One 4 Spindle First Finisher.
- One 12 Spindle Dandy Reducer.
- One 12 Spindle Cap Spinner.
- One 12 Spindle Flyer Spinner.
- One 12 Spindle Ring Spinner.
- One 12 Spindle 2 Fold Cap Twister.
- One 12 Spindle 6 Fold Ring Twister.

The following Drawing, Spinning and Twisting machinery from the Lowell Machine Shop, Lowell, Mass.:

- One 2 Spindle Drawing Box.
- One 6 Spindle Second Finisher.
- One 24 Spindle Dandy Rover.
- One 6 Spindle Cone Reducer.
- One 8 Spindle Cone Rover.
- One 48 Spindle Cap Spinner (4 foot end.)
- One 48 Spindle Cap Spinner (5 foot end.)
- One 48 Spindle Boyd Ring Twister.
- One Six Gang Universal Winder, equipped for cones or straight tubes, made by the Universal Winding Co., Boston, Mass.
- One Tape Band Sewing Machine, made by the Singer Mfg. Co., New York.

#### **The Cotton Warp Preparation Department Includes:**

- One Spooler, made by the Lowell Machine Shop, Lowell, Mass.
- One Warper, made by the Lowell Machine Shop, Lowell, Mass.
- One Slasher, made by the Lowell Machine Shop, Lowell, Mass.
- One Beamer, made by T. C. Entwistle, Lowell, Mass.
- One Winder, made by Altemus & Co., Philadelphia, Pa.
- One 400 End Improved Draper Warper.
- Drawing-in Frames, etc.
- 1 Pat. Slasher Press Roll, J. Battles & Co., Lawrence, Mass.
- 1 Pat. Expansion Comb for Warper, T. C. Entwistle Co., Lowell, Mass.
- 1 Quiller, Johnson & Bassett, Worcester, Mass.
- One Wet and Dry Twister, Draper & Co., Hopedale, Mass.
- Set of six inch spools for Warper, Macrodi Fiber Co., Woonsocket, R. I.



GENERAL CHEMISTRY LECTURE ROOM

**The Woolen and Worsted Warp Preparation Department Includes:**

- One Warp Spooler.
- One Dresser.
- One Reel.
- One Beamer.
- One 48 Spool Creel.

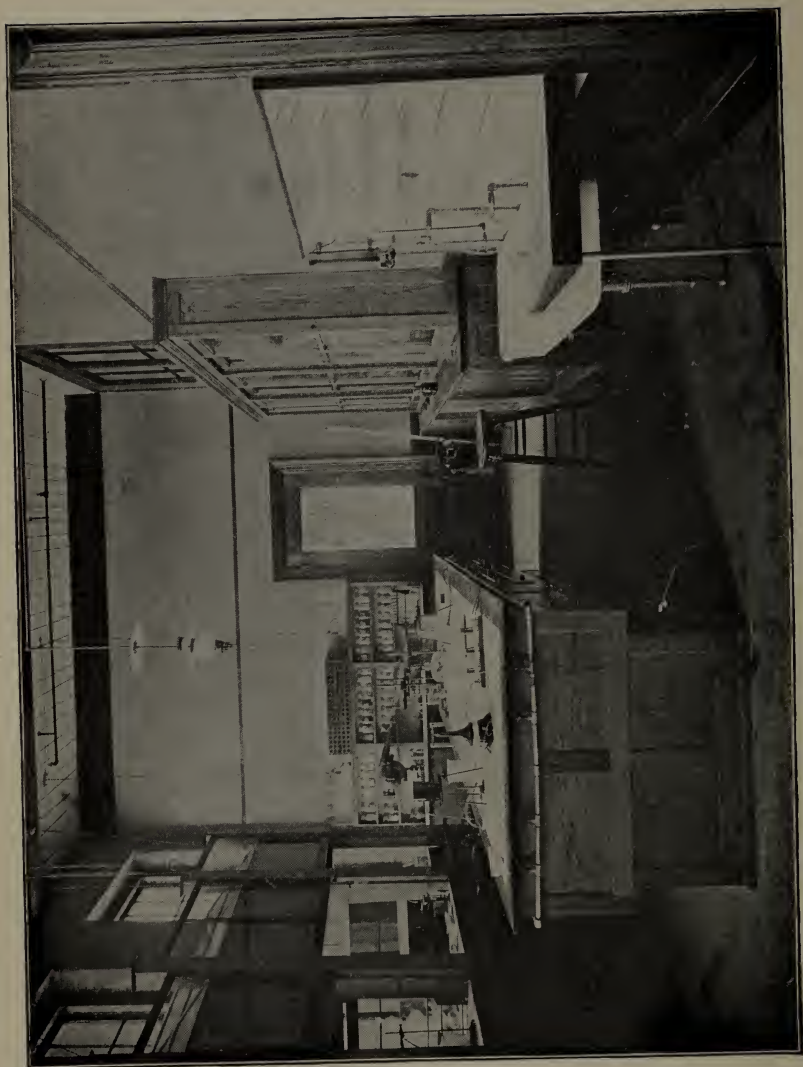
All made by the Davis & Furber Machine Co., North Andover, Mass.

Also a number of hand warping and beaming frames.

**The Power Weaving Department, Includes:**

- One 24 Line Hercules Braider.
  - One 12 Line Braider.
  - One Tubular Braider.
  - One Santach Braider, Providence, R. I.
  - One plain Northrop Loom, made by the Draper Co., Hopedale, Mass.
  - One Improved Northrop Loom, fine sateen, made by the Draper Co., Hopedale, Mass.
  - One Northrop Loom with dobby.
  - One Plain Print Cloth Loom, made by the Whitin Machine Works, Whitinsville, Mass.
  - One Side Cam Twill Loom, made by the Whitin Machine Works, Whitinsville, Mass.
  - One Twenty Harness Dobby Loom, made by Whitin Machine Works.
  - One Five Harness Sateen Loom, made by the Lowell Machine Shop, Lowell, Mass.
  - One 400 hook Schaum and Uhlinger Jacquard with Lowell Machine Shop Loom. 2 x 2 boxes.
  - One Plain Print Cloth Loom, made by the Mason Machine Works, Taunton, Mass.
  - One Harriman Automatic Shuttle Changing Loom.
- And the following looms made by the Crompton-Knowles Loom Works, Worcester, Mass., and Providence, R. I.
- One Model Dobby Attachments.
  - One Knowles Gingham Loom, 4 boxes.
  - One Knowles Fancy Cotton Loom, with 20 harness dobby, 4 boxes, for fancy leno work.
  - One Knowles Fancy Cotton Loom, with 25 harness dobby.





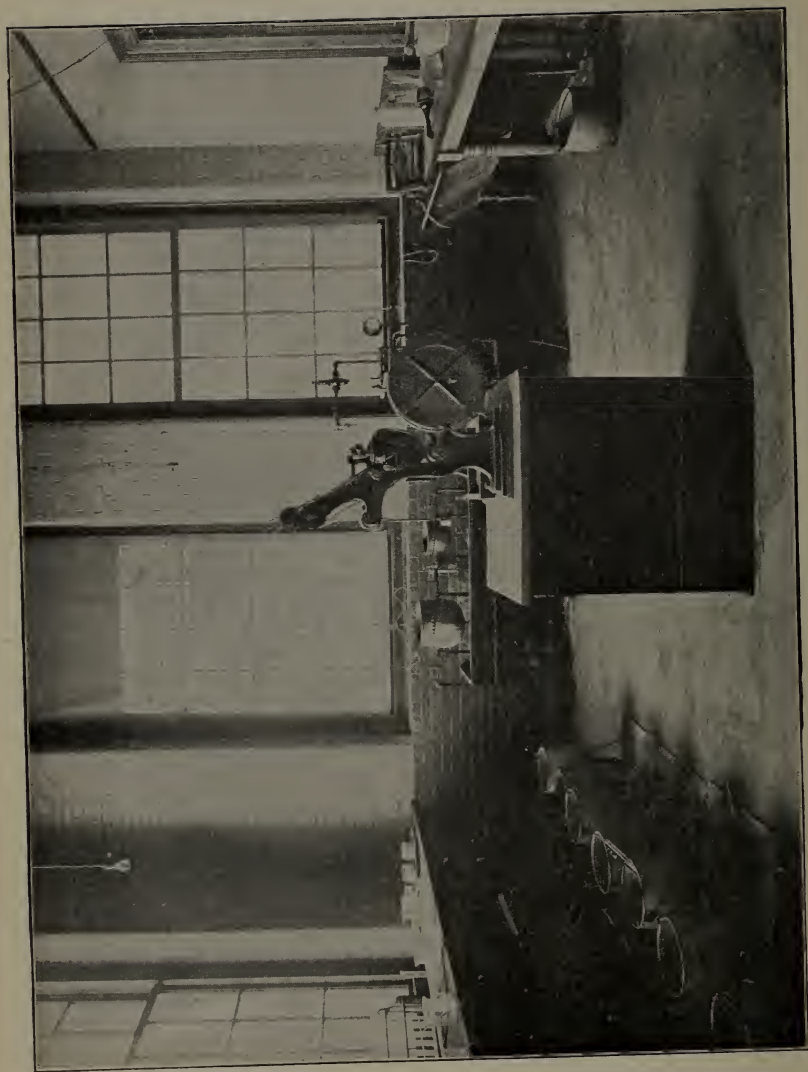
GENERAL CHEMISTRY  
PREPARATION LABORATORY

One Knowles Blanket Loom, with 25 harness dobby, 4 boxes.  
 One Knowles Gem Loom, 20 harness, 4 x 4 boxes.  
 One Knowles Worsted Loom, 32 harness, 4 x 4 boxes.  
 Three Knowles Heavy Woolen Looms, 25 harness, 4 x 4 boxes.  
 One Knowles Fancy Loom, with single lift Jacquard.  
 One Knowles Fancy Loom, with double life Jacquard.  
 One Knowles Fancy Loom, with Jacquard tied up for leno.  
 One Knowles Ingrain Carpet Loom, 4 x 4 boxes.  
 One Crompton Gingham Loom, 4 x 1 boxes.  
 One Crompton Fancy Loom, 6 x 1, with double cylinder, 20 harness dobby.  
 One Crompton Fancy Cotton Loom, with single cylinder, 20 harness dobby.  
 One Crompton Jean Loom.  
 One Stafford Silk Loom, with 1200 hook Halton Jacquard.  
 One Crompton Lappet Loom, with 16 harness dobby.  
 One Crompton Towel Loom, 2 x 1 boxes.  
 One Crompton Ingrain Carpet Loom, 4 x 4 boxes.  
 One Crompton Worsted Loom, 24 harness, 4 x 4 boxes.  
 One Crompton & Knowles Heavy Loom, 20 harness, 4 x 4 boxes.  
 One Lewiston Machine Co. Loom, 4 harness, side cam.  
 One Lewiston Machine Co., Bag Loom.  
 One Kilburn & Lincoln Plain Loom.  
 Eight Lowell Machine Shop Plain Looms.  
 One English Loom.  
 One Jacquard Piano Card Cutting Machine, from John Royle & Sons, Paterson, N. J.  
 One 2,800 hook Halton Tapestry Jacquard.  
 One 800 hook Jacquard, J. Battles & Co., Lawrence, Mass.

### Hand Loom Department

Twelve Hand Looms, 2 x 3 boxes, with 20 harness dobby.  
 Eight Hand Looms, 4 x 4 boxes, with 24 harness dobby.  
 Six Hand Looms, 3 x 3 boxes, with 32 harness dobby.  
 Six Hand Looms, 4 x 4 boxes, with 30 harness dobby.  
 Two Hand Looms, with treadles.  
 Two Hand Looms, 4 x 4 boxes, with 200 hook Jacquard.  
 Two Hand Looms, 3 x 3 boxes, 200 hook Jacquard.  
 Two Hand Looms, 3 x 3 boxes, with 600 hook Jacquard.





DYEING LABORATORY  
SAMPLE PRINTING MACHINE

### **The Silk Preparing Machinery Consists of:**

One Winder.  
One Quiller.  
One Warper.  
One Beamer.  
One Double Frame.

All made by the Atwood Machine Co., Stonington, Conn.

### **The Chemical Laboratories are Equipped as Follows:**

The General Chemistry and Qualitative Analysis Laboratory includes:

One hundred and twenty laboratory desks, each containing a full set of apparatus for the first year's work in chemistry; also gas and water fittings, reagents and sinks.

Four Large Double Hoods.

Two Steam Baths.

### **The Quantitative Laboratory Includes:**

One Water Distilling Apparatus.

One Steam Drying Closet.

One Large Steam Bath.

One Electrolytic Table.

Five Hoods.

Twenty-six laboratory desks, each fully provided with apparatus.

### **The Balance Room Contains:**

One Large Christian Becker Analytical Balance.

Three Small Christian Becker Analytical Balances.

One Standinger Analytical Balance.

One Eimer & Amend Analytical Balance.

One H. L. Becker's Son & Co. Analytical Balance.

### **The Combustion Room Includes:**

One Combustion Furnace, 25 burners.

One Lothar Meyer's Furnace for tubes.

One Kerosene Burner Muffle Furnace.



EXPERIMENTAL DYEING LABORATORY

### **The Microscopical and Volumetric Laboratory Includes:**

Two Benches for volumetric analysis.  
Two Benches for microscopical work.  
Three Bausch & Lomb Compound Microscopes.  
One Nachet et Fils Compound Microscope.  
Desk and shelves for the apparatus and reagents necessary for this branch of the work.

### **The Assistant Instructors' Laboratory Includes:**

One Large Case for chemicals.  
One Double Hood.  
One Copper Water Bath.  
One Soapstone Sink with a drain board.  
Benches, desks and complete fittings for water, gas and suction.

### **The Private Laboratory Includes:**

One Christian Becker Balance.  
One Case for Chemicals and Apparatus.  
Three Laboratory Benches, with necessary fittings.  
One Large Hood.  
One Steam Bath.  
One Experimental Dye Apparatus.  
One Porcelain Sink.

### **The Chemical Lecture Room Includes:**

A lecture table fully equipped with gas, water, sinks, a hood and sufficient apparatus for lecture experiments.

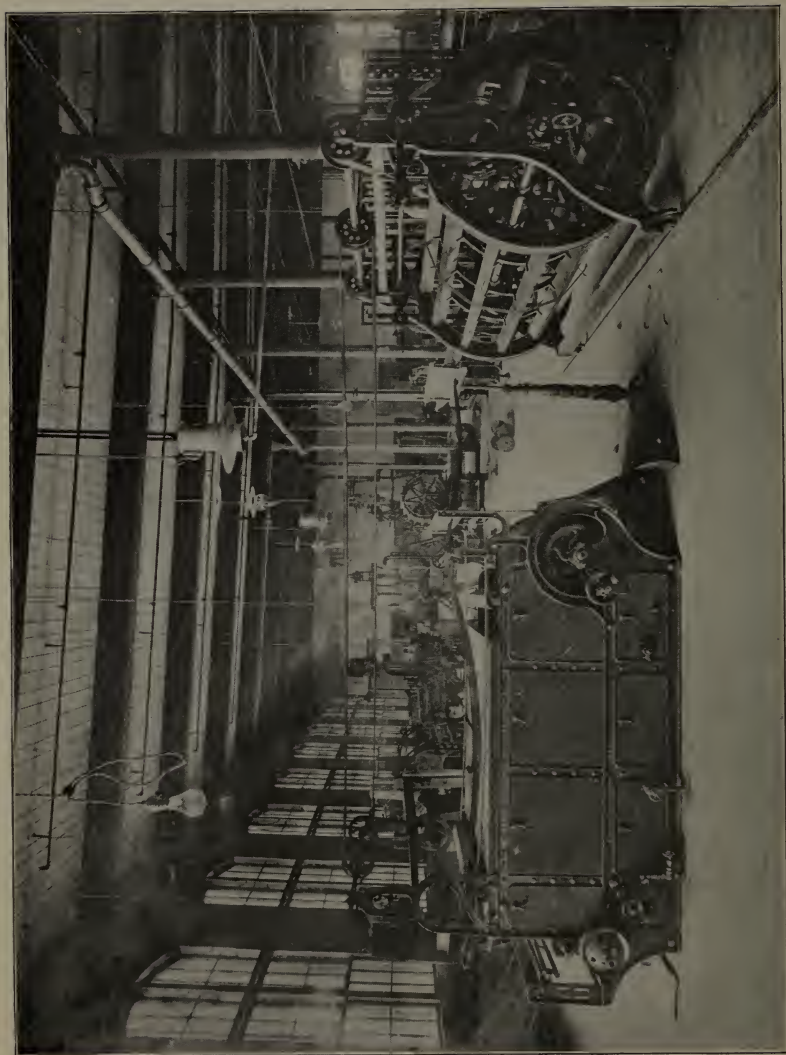
Seats are provided for 80 students, being arranged on a raised floor so that every student has a full view of the lecture table.

### **The Chemical Museum**

This contains various collections of dye stuffs and chemicals for exhibition and for lecture demonstration.

### **Experimental Dyeing Department**

The dyeing laboratory is equipped with individual benches, small dyeing apparatus, reels, balances, apparatus for dye testing,



WEAVE ROOM



such as frames for exposing dyed material to light, and a complete collection of dyestuff samples and sample cards.

One Small Hydro-Extractor, from W. H. Tolhurst & Sons, Troy, N. Y.

Twenty-four Steam Jacketed Experimental Dyeing Machines.

One Drying Chamber.

One Ageing Chamber.

The private dyeing laboratory is well equipped with the necessary apparatus for experimental dyeing and research work.

### Printing Department

One Calico Printing Machine, made by Mather & Platt, Oldham, England.

One Iron Jacketed Steaming Chamber from A. Edmeston & Son, Salford, England.

One set of Steam Jacketed Copper Kettles.

### Dyeing and Finishing Departments

One 2 String Washer, Rodney Hunt Co., Orange, Mass.

One Rodney Hunt Fulling Mill.

One Up and Down, Dry and Wet Gig and

One Two Cylinder Double Acting Brushing Machine, from Curtis & Marble, Worcester, Mass.

One Kicking Mill, James Hunter & Co., North Adams, Mass.

One 6-4 Double Shear from Parks & Woolson, Springfield, Vt.

One 6-4 Voelker Rotary Press, Woonsocket, R. I.

One Sewing Machine, Birch Brothers, Somerville, Mass.

One Measuring Machine, from Fabric Measuring and Packaging Co., New York, N. Y.

One Kier, from Atlantic Works, E. Boston, Mass.

One 4 String Dyeing Machine from Rodney Hunt Machine Co.

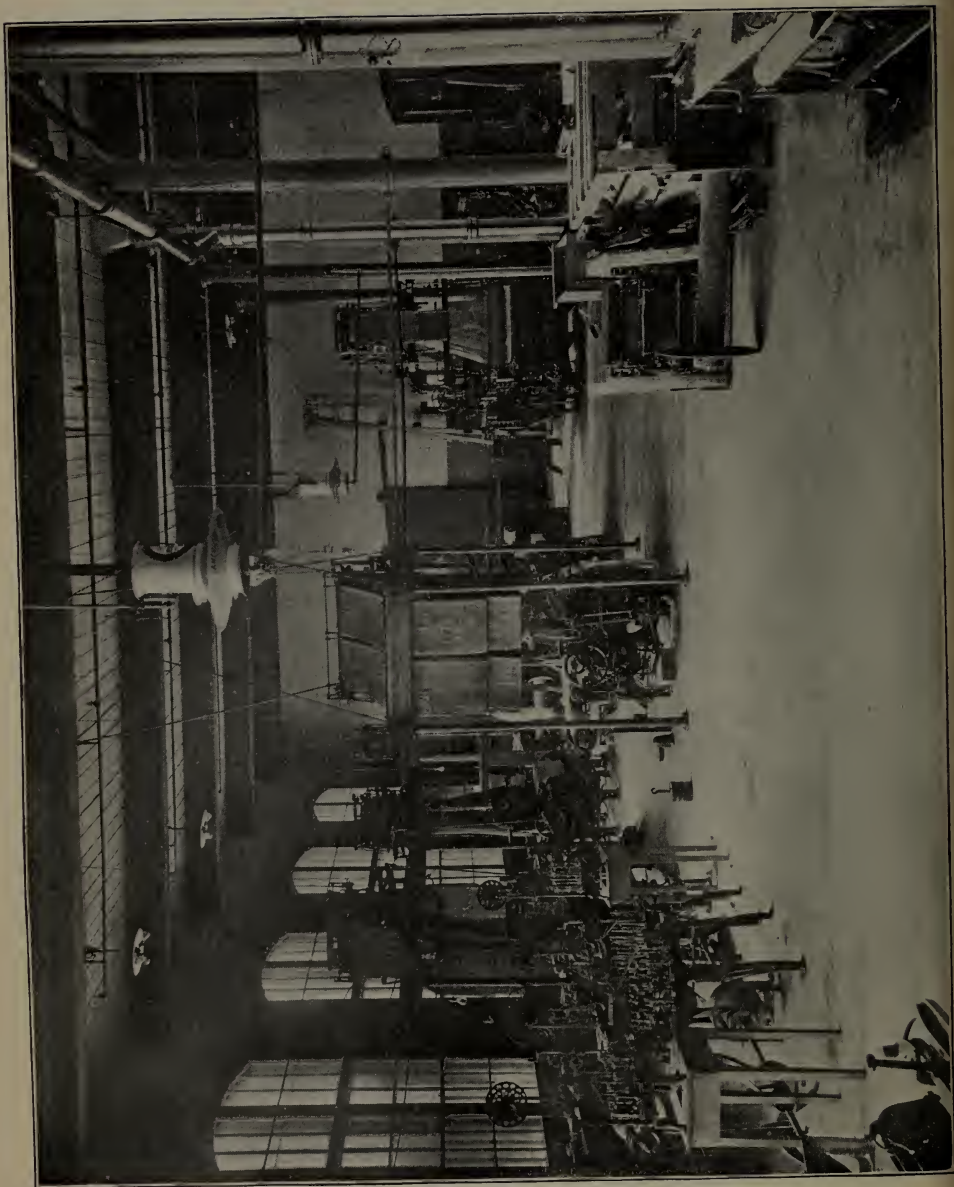
One Mercerizing Machine.

One Raw Stock Dyeing Machine, Klauder-Weldon Dyeing Machine Co., Amsterdam, N. Y.

One Yarn Dyeing Machine, Klauder-Weldon Dyeing Machine Co. Seven Dye Tube.

One Hydro-Extractor.

The remaining machinery and apparatus necessary for the complete outfit in dyeing and finishing is to be put in place during the year.





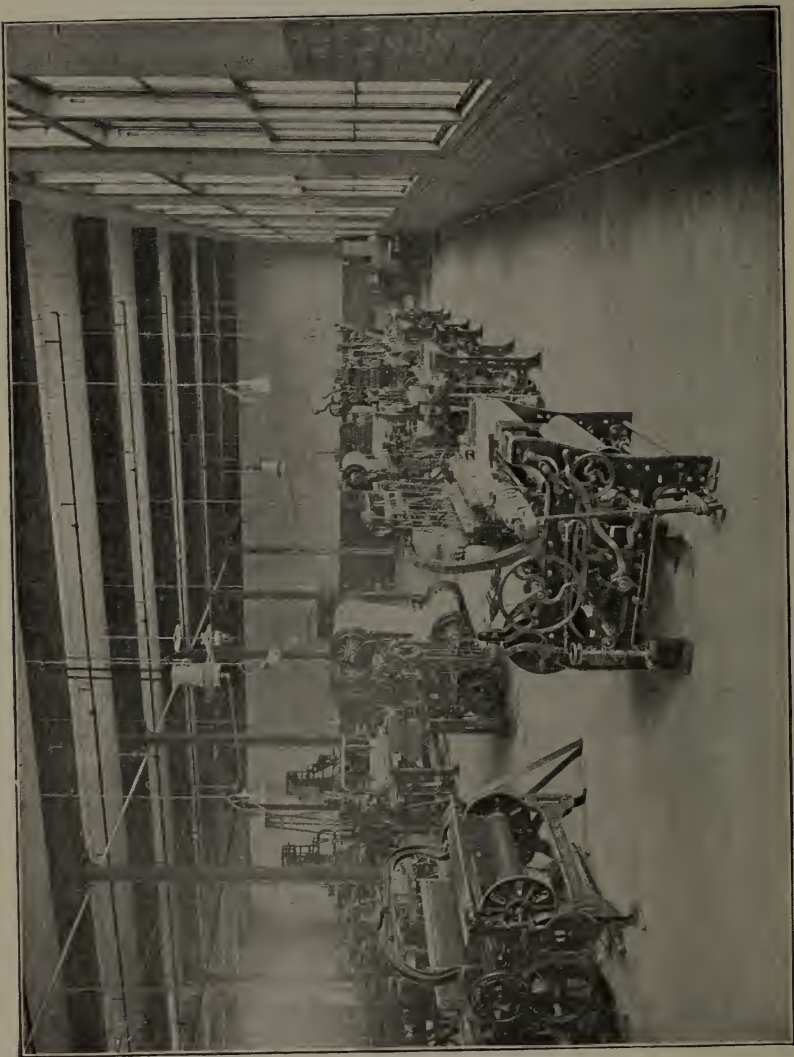
## Physical Laboratory

Through the generosity of a friend of the School a laboratory has been provided with the most approved apparatus for testing the physical properties of all fibres, yarns and fabrics; the equipment includes:

- One Bausch and Lomb D. D. Microscope.
- The inch, 1 inch, and  $\frac{1}{2}$  inch regular eyepieces.
- Three-fourths inch (photographic,) 2-3 inch, 1-6 inch, 1-12 inch (oil immersion) objectives.
- One Nicol prism polarizer and analyzer.
- One Eye Piece Micrometer.
- One Filar Micrometer, (1 inch equivalent eye piece) for refined diameter determinations.
- One Standard Glass Stage, divided to 1-10 and 1-100 m. m., with corrections as tested against the International m. m.
- Complete outfit for mounting slides.
- Complete outfit for photo micrography.
- Camera Lucida.
- Microtome Sectioning Outfit.
- One Small Skein Testing Machine.
- One set Conditioning Ovens for moisture determination.
- One Yarn Testing Machine, adjusted to test strength, twist, take up, elasticity, and stretch.
- One Hydraulic Cloth Strength Testing Machine.
- One Brown & Sharpe Metre Reel.

## Power, Light, Heat and Ventilation

- Two 100 H. P. Stirling Water Tube Boilers.
- One Sturtevant Induced Draft Apparatus, including fan, direct connected to the Sturtevant vertical engine and equipped with two way dampers.
- One Sturtevant Smoke Filtering Apparatus.
- One Foster Reducing Valve used as automatic pressure regulator for draft engine.
- One Locke Steam Pressure Regulator for draft engine.
- One Knowles Boiler Feed Pump, 6 in. x 4 in. x 6 in.
- One Warren Webster Feed Water Filter, heater and oil extractor.
- One Payne 14 in. x 14 in. Automatic High Speed Engine of 125 H. P. and 260 r. p. m.



WEAVE ROOM

One 9½ in. x 11¾ in. Nash Gas Engine of 50 H. P. of the three cylinder type, with speed regulating clutch and hit and miss governor.

One Motor Driven Air Compressor 5½ in. x 6 in. with a storage tank of 20 cubic feet capacity, 100 lbs. per sq. in. pressure.

One Complete Sturtevant Double Duct System for heating and ventilating Southwick Hall. This apparatus is designed to provide the proper amount of fresh warm air called for by the State law as applied to educational institutions, and includes a 9ft. x 4ft. fan direct connected to the Sturtevant horizontal engine, drip tank and Knowles automatic return pump, 4½ in. x 2¾ in. x 4 in. arranged to deliver either to the feed water heater or to the boilers direct.

One Sturtevant Fan and Heater for Kitson Hall and Falmouth Street Building, direct connected to a Sturtevant inverted engine.

One Cross Oil Filter.

One Complete Moistening Apparatus installed by the American Moistening Co., Boston, Mass., including Knowles triplex 4 x 4 power pump, tank, and 18 moistening heads.

One Complete Sprinkler System for fire protection, using the Grinnell glass button heads.

One Bullock 75 K. W. Direct Current Multipolar Compound Generator, wound for 220 volts, over compounded 20 volts from no load to full load and direct connected to the Payne engine.

One Bullock 30 K. W. Generator of the same type, direct connected to the Nash gas engine. The switch board is arranged so that either unit may be thrown in independently on the power or lighting feeders or the two machines may be run in parallel. The lighting circuits are on the two wire 220 volt system and supply the equivalent of 660-16 candle power lamps. The power circuits are on the same system and supply approximately 140 H.P. in motors.

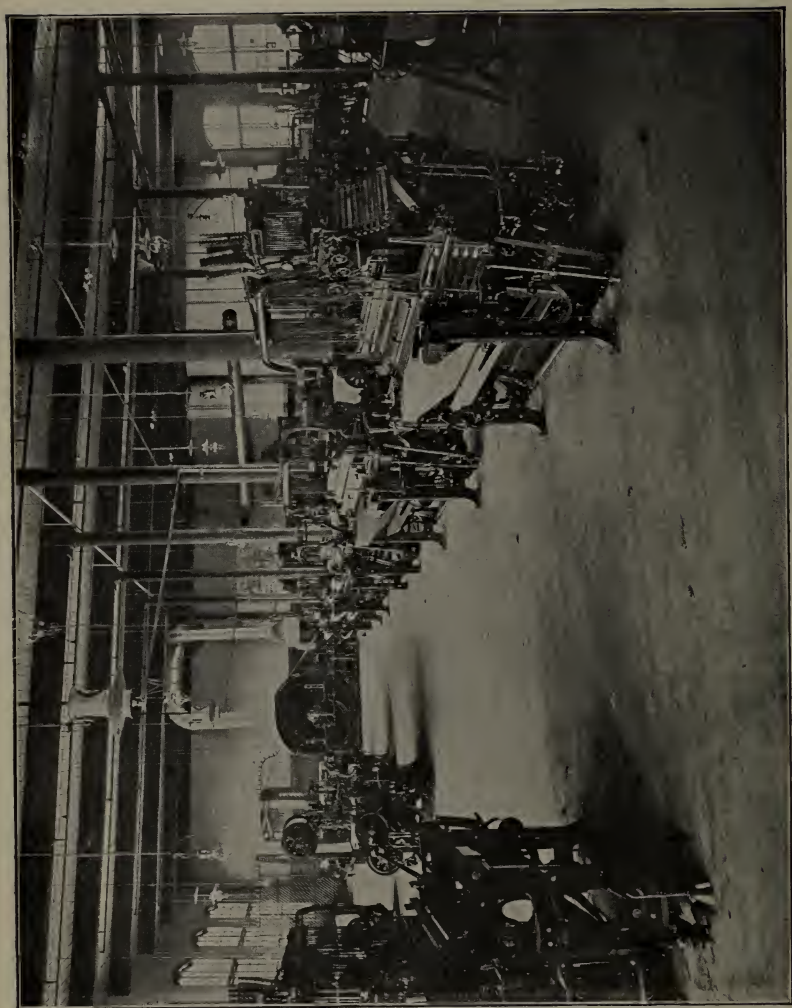
Three 24 H. P. Bullock Motors.

Four 15 H. P. Bullock Motors.

One 3 H. P. Motor from New England Motor Co.

One 2 H. P. Motor from New England Motor Co.

One 4 H. P. G. E. Electric Dynamometer which may be used as a double current generator or rotary transformer receiving direct current at 220 volts and delivering three phase alternating



WEAVE ROOM

current which by a step up transformer will give 220 volts at 60 cycles.

One 250 volt Weston Portable Voltmeter.

One 250 volt Weston Portable Voltmeter with calibrating coil.

One 150 ampere Weston Portable Ammeter.

One Weston Portable Millivoltmeter with 200 milli-volt and 20 milli-volt scales.

One 2 ampere and one 20 ampere shunt for use with above instrument as an ammeter.

One D'Arsonval Reflecting Galvanometer.

One Simple Galvanometer.

One Wheatstone Bridge.

Two Direct Current Self Feeding Arc Lamps.

Two Hand Feed Arc Lamps for stereopticans.

Resistance boxes of various sizes and other apparatus necessary for commercial testing of lamps, motors, etc.

An Exhibition Board containing samples of the Chloride and Exide Storage Battery Plates donated by the Electric Storage Battery Co. of Philadelphia.

All of the above apparatus is available for experimental work and affords opportunities for laboratory practice for the classes in mechanical and electrical engineering.

### **Athletic Field**

Through the generosity of Mr. Frederic Fanning Ayer, the school has been provided with a Campus and Athletic Field of about three acres.







# Day Students

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## Entrance Qualifications

Candidates for admission will be accepted upon presentation of properly vouched certificate showing the completion of a regular four year High School course. For all others, there will be held examinations, as stated in calendar; candidates failing to pass at June examinations will be allowed to try again in September; those who cannot attend the June examinations, may present themselves in September; if conditioned, a further examination will be appointed. Requirements in general will be as follows:

### Arithmetic

Definitions; elementary operations in addition, subtraction, multiplication and division; squares; cubes; square root; interest, discount; fractions, simple and complex; decimals; percentage, allegation; ratio and proportion. Metric System.

### English

The candidates will be expected to correct examples of bad English, for spelling, punctuation, capitalization, grammar and sense; also to write a short composition on a given familiar theme.

### Geography

Location of principal countries, with capitals, large rivers, mountains, etc., noting characteristics of climate, productions and inhabitants. General statements rather than specialization will be sought.

### Algebra

Definitions; fundamental operations, parenthesis, factoring; highest common factor; least common multiple; fractions, simple and complex; simple equations, one or more unknown quantities; involution and evolution; square and cube root; logarithms.



ELECTRICAL ENGINEERING  
LABORATORY

## **Geometry**

As much plane geometry as is included in any of the generally accepted text books. The student should be familiar with properties of plane rectilinear figures, the measurement of angles, the circle, polygons, etc.

## **Preparation**

For those who intend to take Chemistry and Dyeing, physics is almost indispensable. In a preparatory course, particular attention should be given to algebra, geometry, manual training, chemistry, physics (including mechanics, heat, light and electricity), French and German.

## **Advanced Standing**

Candidates who may have received previous training in any of the subjects ordinarily taken in the regular courses may present themselves for examination as per calendar. If a satisfactory rank be attained, they will be given such further work as will be best suited to their advancement.

## **Attendance Card**

At the beginning of each term all students must fill out and file with the Principal on blank forms which are provided, a formal application for such subjects as he may choose, subject to the approval of the Principal. When an attendance card is once approved, no change can be made except through the Principal.

## **Application Blanks**

A blank form of application may be found at the end of this bulletin. This should be properly filled out by all applicants.

## **Fees**

The fee for the day course is \$100 per year for residents of Massachusetts; for non-residents it is \$150 per year.

Three-fifths of the fee is charged for a single term and is payable on or before October 10, the balance on or before February 10,



BOILER HOUSE

of each year. After payment is made, no fee or part thereof can be returned, except by special action of the Trustees.

Special students pay in general, the full fee, but if a course be taken involving attendance at the school during a limited time, application may be made to the Principal for a reduction.

Students must provide their own books, stationery, tools, etc., and pay for any breakage or damage that they cause. The above fee includes free admission to any of the evening classes in which there is accommodation, should any day student desire to attend.

A minimum deposit of \$15 will be required to cover the cost of breakage in the chemical laboratory, the unexpended balance to be returned to the student at the end of the year.

The fees for the evening classes vary and are indicated elsewhere.

Fees are strictly payable in advance, and no student will be admitted to the classes until his fees are paid and he has filed an attendance card.

### **Aid to Students**

Free scholarships have not been provided for but provision will be made for applicants for the day courses who have the qualifications for matriculation and are properly vouched for, who furnish satisfactory evidence that they are unable at entrance to meet the charges in whole or in part for tuition.

### **Examinations**

Examinations will be held at the end of each term.

Students who do not show sufficiently satisfactory progress in the final examinations at the end of the first year will not be admitted to the second year classes, and the same applies to second year students with reference to their admission to the third year classes.

Intermediate examinations will be held, which will serve to inform the student as to progress made, or lack of it, and may be appointed at any time.

In general, the examinations will cover the work of the preceding term, but at the end of the third year, candidates for diplomas may be examined on all preceding work.

Daily work and regularity of attendance will also be considered in making up the reports of standing.





MECHANICAL DRAWING ROOM



Continued or persistent absence (or tardiness) from the classes will be considered sufficient reason to exclude a student from the class.

### **Reports of Standing**

Twice during each term informal reports are sent to students, or to guardians of such as are not of age; and at the end of each term formal reports are made.

### **Thesis**

All candidates for the diploma of the school must file with the Principal not later than May 15, a report of original investigation, or research, written on a good quality of paper, 8x10 inches, with one inch margin at left, and  $\frac{1}{2}$  inch at right of each page; such thesis to have been previously approved by the head of the department in which it is made.

### **Graduate Course**

Graduates of technical courses of other schools are invited to communicate with the Principal with reference to special courses in the textile studies. Previous training in the engineering branches will usually reduce materially the time necessary to complete any of the courses at this school. The advantages offered to such persons for special research work are unexcelled, and a most profitable course may be arranged.

### **The Regular Courses**

The title of each of the regular courses is an indication of the particular nature of the course, unless it be in the case of Course III. There is a considerable demand for a general textile course in which the whole subject may be treated broadly; this course is organized with this particular object in view, although various options are offered, in which some one branch may be followed at length. Certain general studies are included in each course, in order that in specializing, a too narrow view may be avoided.

### **Special Courses**

While it is always urged that regular courses be followed if possible, there is opportunity to make special arrangements to fit



MECHANICAL ENGINEERING  
CLASS ROOM

for particular positions, as for example:—yarn mill, weaving special fabrics, designing, etc., and owing to the large number of possibilities, those desiring such courses are invited to correspond with the Principal. See paragraph “Certificate” below.

### **Diploma**

The diploma of the School is awarded upon the satisfactory completion of a regular course, covering not less than three years, except where entrance is to advance standing. In such cases at least one year’s residence will be required.

### **Certificate**

For the satisfactory completion of a three year’s course in any special department, the certificate of the School will be awarded; it is possible to complete such a course in less than three years, if the candidate be passed to advanced standing, but at least one year’s attendance will be required.

### **Medal of Honor**

The New England Cotton Manufacturers’ Association offers annually a medal to that member of the graduating class who shall be selected by a committee of the Association as best fitted to receive it.

### **Conduct**

Day students are expected to attend all lectures, classes and demonstrations of practical work, except when permission to be absent has been obtained from the Principal. In cases of sickness or other unavoidable absence, written explanation must be sent to the Principal. The daily work of the student forms an important part of his record, and no student will be awarded the diploma unless this portion of his record is clear.

Books will be prescribed for study, for entry of lecture notes and other exercises, and will be periodically examined by the lecturers. The care and accuracy with which these books are kept will be considered in determining standing.

Students are required to return to the proper place all instruments or apparatus used in experimental work and to leave all

machinery and apparatus with which they may experiment clean and in working order. All breakages, accidents, or irregularities of any kind must be reported immediately to the head of the department, or instructor in charge.

In the cases of either day or evening students, irregular attendance, lack of punctuality, neglect of either school or home work, disorderly or ungentlemanly conduct or general insubordination, will be considered good and sufficient reason for the suspension of a student by the Principal, and for his subsequent removal from the School and forfeiture of all School privileges, if the President of the School so decides.

Apparatus used in the Dyeing or Chemical Laboratory will be provided by the School, but a deposit must be made by the student at the beginning of the term sufficient to cover its cost, and this deposit will be returned to him at the close of the term, subject to such deduction as will reimburse the School for broken or damaged articles.

### Library

The School Library is supplied with leading textile books and with works dealing with science, art or industries allied to the textile trades. The leading textile trade papers are kept on file.

### Sessions

The regular school sessions will be in general from 9 a. m. till 1 p. m., and from 2 to 4.45 p. m., except Saturdays, when the buildings will be closed in the afternoon.

A tabular view will designate the hours at which the various classes meet. This will be rigidly adhered to and the register will be marked for each lecture or demonstration.

### General

Students from a distance, requiring rooms and board in the city, may, if they desire it, select the same from a list which is kept at the School. The cost of rooms and board in a good district is from \$4 per week upwards.

All raw stock and yarn will be provided by the School, and all the productions of the School remain, or become, the property of the Trustees, except by special arrangement, but each student will

be allowed to retain specimens of yarn or fabrics that he has produced, if mounted and tabulated as prescribed by the Principal, and facilities will be given for the preparation of a collection of such fabrics as are produced in the School, with all the instruction for their manufacture. It is understood that the Trustees may retain in the School such other specimens of student's work as the Principal may determine.

Prospective students who are desirous of arranging special courses by omitting a portion of one course and adding a portion of another, are invited to communicate with the Principal.

An additional entrance examination to suit the convenience of students from a distance (out of New England,) will be arranged.

Lock boxes will be provided for the use of students, sufficiently capacious to contain clothing, books and tools. A deposit of 25 cents will be required, which will be returned to the student upon surrender of the locker key.

No books, instruments, or other property of the School will be loaned to the students, or allowed to be removed from the premises.

### **Materials**

Students must purchase such tools, instruments, text books, and apparatus as may from time to time be recommended by the head of each department, and the cost of these for day students will be from \$15 to \$20, and for evening students from \$1 upwards, according to the subject studied.

### **Awards**

Gold Medal Paris Exposition, 1900, for general excellence. A Special Medal Merchants and Manufacturers Exhibition, Boston, 1900. The Pan American Medal awarded to the School, 1901.

### **Bulletins and Catalogue**

All students registering and paying the regular fee for the course selected will be entitled to the Bulletins and Catalogue when issued.

Sample copies may be had on application to the Principal.

# Courses of Instruction

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## DAY CLASSES

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For details of the several subjects see subsequent pages, beginning with page 64

### FIRST YEAR — FIRST TERM

( *Common to all courses.* )

Elements of Mechanism  
Mechanical Drawing  
Mathematics

Hand Looms  
General Chemistry  
Freehand Drawing

Decorative Art

Options :

German and Spanish

### Course I. — Cotton Manufacturing

#### FIRST YEAR — FIRST TERM

( *Common to all courses, see above* )

#### FIRST YEAR — SECOND TERM

Cotton Fibre  
Microscopic Examination of Fibre  
Design Construction  
Cloth Analysis  
Elements of Mechanism  
Trigonometry

Cotton Manipulation  
Cloth Construction  
General Chemistry  
Textile Chemistry  
and Dyeing  
Freehand Drawing

Mechanical Drawing

Options :

German and Spanish



## SECOND YEAR — FIRST TERM

Cotton Spinning	Mechanical Engineering
Machine Drawing	Cloth Analysis
Textile Chemistry and Dyeing	Cloth Construction
Designing	

## SECOND YEAR — SECOND TERM

Cotton Spinning	Mechanical Engineering
Machine Drawing	Power Weaving
Textile Chemistry and Dyeing	Designing
Cloth Analysis	Electricity
Cloth Construction	

## THIRD YEAR

Weaving	Designing
Knitting Machinery	Mill Engineering
Thesis	Cloth Construction
Cloth Analysis	

## Course II — Wool Manufacturing

### FIRST YEAR — FIRST TERM

( *Common to all courses, see page 60* )

### FIRST YEAR — SECOND TERM

Wool Fibre	Woolen Spinning
Microscopic Examination of Fibres	
Design Construction	Cloth Construction
Cloth Analysis	General Chemistry
Elements of Mechanism	Textile Chemistry and
Mechanical Drawing	Dyeing
Trigonometry	Freehand Drawing

### SECOND YEAR — FIRST TERM

Worsted Spinning	Applied Mechanics
Machine Drawing	Designing
Textile Chemistry and Dyeing	Cloth Analysis
Cloth Construction	

## SECOND YEAR — SECOND TERM

Worsted Spinning	Mechanical Engineering
Machine Drawing	Power Weaving
Textile Chemistry and Dyeing	Designing
Cloth Analysis	Electricity
Cloth Construction	

## THIRD YEAR

Power Weaving	Designing
Knitting Machinery	Mill Engineering
Thesis	Cloth Analysis
Cloth Construction	

## Course III. — Designing

### FIRST YEAR — FIRST TERM

( *Common to all courses, see page 60* )

### FIRST YEAR — SECOND TERM

Design Construction	Cloth Construction
Cloth Analysis	Hand Looms
Design Sketching	Freehand Drawing
Mechanical Drawing	General Chemistry
Trigonometry	Textile Chemistry and
Elements of Mechanism	Dyeing
Decorative Art	
Options :	
Woolen and Worsted Spinning	Cotton Spinning

### SECOND YEAR

Design Construction	Cloth Construction
Cloth Analysis	Hand Looms
Design Sketching and Jacquard Work	
Decorative Art	Weaving
Textile Chemistry and Dyeing	Mechanical Engineering
Options : FIRST TERM	
Woolen and Worsted Spinning	Cotton Spinning

### THIRD YEAR

Designing — Advanced Work	Weaving
Thesis	Decorative Art
Cloth Construction	Cloth Analysis
Options :	
Mill Engineering	Strength of Textile Materials

## Course IV — Chemistry and Dyeing

### FIRST YEAR — FIRST TERM

( Common to all courses, see page 60 )

### FIRST YEAR—SECOND TERM

General Chemistry	Qualitative Analysis
Textile Chemistry and Dyeing	Mechanical Drawing
Stoichiometry	Designing
Elements of Mechanism	German
Cloth Analysis	Cloth Construction
Trigonometry	

### SECOND YEAR

Textile Chemistry and Dyeing ( continued )	Advanced Inorganic Chemistry
Industrial Chemistry	Organic Chemistry
Applied Mechanics	Electricity
Options :	
Designing	Weaving
German	Advanced Mathematics

### THIRD YEAR

Quantitative Analysis	Industrial Chemistry and Dyeing
Dye Testing	Microscopy
Physical Chemistry	Thesis
Options :	
Weaving	Mill Engineering

## Course VI — Textile Engineering

### FIRST YEAR — FIRST TERM

( Common to all courses, see page 60 )

### FIRST YEAR—SECOND TERM

Trigonometry	Physics
Elements of Mechanism	General Chemistry
Machine Drawing	Designing
Options :	
Woolen and Worsted Spinning	Cotton Spinning

### SECOND YEAR

Advanced Mechanism	Steam and Water Power
Machine Drawing	Electricity
Applied Mechanics	Weaving
Options :	
Woolen and Worsted Spinning	Cotton Spinning
Advanced Mathematics	

### THIRD YEAR

Mill Engineering	Physical Laboratory
Mill Engineering Drawing	Applied Electricity
Power Generation, Measurement and Transmission	
Thesis	

# Cotton Spinning Department

## COTTON.

### Lecture Course:

Ancient History.

Structure of Fibres.

Botanical Varieties—Their classification and characteristics.

Commercial Varieties, classification, characteristics and adaptatives

Methods of Cultivation.

Ginning—Roller and Saw Gins.

Baling—Various forms of Baling Presses and their products, characteristics of each.

Mixing—Per cent. grade, variety and color mixtures.

## PICKING.

Construction and operation of various machines used in the Picking process, and calculations connected with same.

Bale Breaker, Automatic Feed, Opener, Breaker, Intermediate and Finisher Pickers.

Cleaning Trunks, Evener Motions, Beaters, Regulation of Air Drafts, etc.

## CARDING.

Principles of Carding.

Construction and operation of various forms of Cards.

Top Flat Cards.

Revolving Flat Cards.

Card Clothing, Grinding, Setting, Drafts, Speed, Production and Calculations connected therewith.

Principles of Waste Carding.

Defects in operation and in quality and amount of production of the foregoing machinery and remedies.

Practical illustrations of principles taught and analysis of product.

## DRAWING.

Theory of Drawing.

Effect of Doublings.

Construction and operation of the Railway Head.

Evener Motions.

Stop Motions.

The Drawing Frame.—Varieties and Details of Construction.

Stop Motions—Mechanical and Electrical, Rolls—Common and Metallic and peculiarities of each.

Roll Setting, Proportioning of Drafts, Condensing.

Operation, Adjustment and Care of Drawing Machinery.

Speeds, Drafts, Production and Calculations for each.

## ROVING PROCESSES.

The development of the Fly Frames.

Mechanical construction and operation of the Slubber.

Intermediate, Fine and Jack Fly Frames, and features of each.

Explanation of Differential Motions, Builder Motions, Reverse Motions.

The functions and development of the Cones.

Draft, Twist, Tension, Lay and Taper regulation and the effect of each and calculations for same.

The Reeling, Weighing and Numbering of Roving.

Space, Traverse, and length of machines of the several Roving Processes.

Defects in Adjustment, Operation and Product of Roving Machinery, and the remedy for those defects.

Practical operation of the machinery illustrative of instruction given.

## SPINNING.

Classification of Yarns in regard to material, varieties, uses, twist, etc.

Reeling, Weighing and Numbering of single and ply Yarns.

Comparison of Throstle, Ring and Mule Spinning.

Construction and operation of Ring Spinning Frames.

Twist.—Amounts for warp, filling, hosiery yarns and ply yarns.

Hard and Soft. Regular and Reverse.

Comparisons of single and double roving in Spinning.

Consideration of Spinning Frame details. Spindles, Rings, Separators, Builders.—Warp Filling and Combination.

Calculations for Speed, Drafts, Twists and Production.

Twisting and Fancy Yarns Loop, Nub, Splash, etc.

## COMBING.

Consideration of the Combing operation and preparatory machines. Sliver Lap Machine.

Ribbon Lapper.

Comber.—Construction, Operation, Settings, Timings, Adjustment.

Per cent. of Noil.

Calculations in regard to Drafts, Speeds and Production.

Practical application of principles taught.

## MULE SPINNING.

The development of the Throstle, Spinning Jenney and Mule.

Construction and operation of the Mule.

Details of operation, Drawing, Twisting, Backing off, Winding, Re-engaging.

Details of construction.—Builder Motion, Quadrant, Roller Motion, Nosing Motions, Jacking Motion, etc.

Calculation in regard to Speeds, Draft, Twist, Drag and Production.

## ORGANIZATION.

Figuring of "Program" of Doublings and Drafts, throughout the entire yarn manufacturing process, for the production of different varieties and numbers of cotton yarns.

Calculations for Schedules of Machinery required for the production of different amounts of various Yarns.

The economic arrangement of Machinery.

Powers required for various Machines, etc.

Knitting.

Construction and operation of Web Machines, Rib Machines, Loopers, in the production of plain hosiery.

List of machinery adapted for different purposes in Cotton Mill Work.

Layout of Machinery for different processes.

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## Woolen and Worsted Spinning Department

### WOOLEN SPINNING.

Raw Materials.

Animal Fibres:—Wool, Silk, Mohair, Alpaca, Vicuna, Cashmere, Camel Hair, etc.

Vegetable Fibres:—Cotton, Flax, Hemp, Jute, Ramie.

Wool Substitutes:—Noil, Shoddy, Mungo, Extracts, Flocks.

Waste Products manufactured on Woolen Machinery:—

Cotton Waste, Linters, Flax, Hemp, and Jute Waste.

Sources of supply and relative values of above.

Chemical and Physical properties and composition.

Microscopical examination.

### WOOL FIBRE.

Physical and chemical structure—Difference between wool, hair and fur—Physical properties, Strength, Elasticity, Curl, Lustre, etc.

Felting Property—Hygroscopic Property.

Structure and cause of Kemps.

Definitions of trade terms:—Picklock, XXX, XX, X,  $\frac{1}{2}$  Blood,  $\frac{3}{8}$  Blood,  $\frac{1}{4}$  Blood, Delaine. Braid, etc.

Pulled Wools—Their uses and classification.

### WOOL SORTING.

Difference between Sorting and Grading,—Sorting and Blending.

Judging Spinning Qualities.

Estimating Shrinkage.

Definitions of trade terms—Cots, Hog, Shurled Hogget, Wether, Fribs, Paint, Stain, Shoulder, Cast, etc.



## WOOL SCOURING.

Object of Wool Scouring.

Composition of Yolk and Suint.

Cholesterol and Lanolin.

Materials used as Detergents.

Emulsion Process:—Use of Soda, Potash, Hard and Soft Soaps.

Manufacture of Scouring Soaps with tests for impurities.

Water in Wool Scouring with tests for hardness, etc.

Effect of heat on Wool Fibre with proper heat of scouring liquor.

Recovery of potash salts and wool fat from waste scouring liquor.

The Solvent process—Degreasing Wool, with Naphtha.

Construction and use of Scouring Machines and Rinse Boxes with Speeds, Adjustments and Productions.

Construction and use of Dryers, Table and Artificial.

Effect of heat on Lustre; proper heat for various classes of Wool:—(Braid, Botany, Mohair, etc.)

## CARBONIZING.

Object of Carbonizing.

Carbonizing Wool, Noils, Burr Waste, Rags, etc.

Carbonizing Agents:—Sulphuric Acid, Aluminium Chloride, etc. Hydrometers.

Strength of Carbonizing Agents.

Carbonizing with Acid Gases.

Neutralizing.

## BURR PICKING.

Object of Burr Picking—What wools are Burr Picked and why they are not Carbonized.

Construction and Use of the several Kinds of Burr Pickers.

Adjustments, Speeds and Production of same.

## MIXING AND OILING.

Object of Mixing. Laying down lots.

Mixing Different colors of Wool.

Mixing Wool with Cotton, Shoddy, Noils, etc.

Object of Oiling—Discussion of various Kinds of Oils used, Olive Lard, etc.

Oil Testing, Viscosity, Flashing Point, etc.

Manufacture of Emulsions.

Construction and Use of Automatic Oilers, Feeds and Pickers.

Speeds, Productions and Calculations for cost of Lots when materials of different values are used.

## CARDING.

Principles of Carding.

Functions of various parts:—Feed Rolls, Lickerins, Tumblers, Workers, Strippers, Cylinders, Fancies, Dickies, Doffers, etc.

Construction of various parts.

Direction of Revolution and Speeds.

Card Clothing—Construction and uses of the various Kinds of Backing: Leather, Flexifort, etc.—The several Kinds of Wire:—Garnett, Metallic, Convex, Lickerin, etc.

The "Counts and Crown" method of counting Card Clothing.

Card Adjusting and use of Card Sets.

Clothing the Card.

Card Grinding and Grinders, Solid Roll, Traverse, Screw and Chain.

## WOOLEN CARDS.

Construction and use of the First Breaker, Second Breaker and Finisher.

Various methods of Coupling Cards.

Card with Breast.

Woolen Card Feeds.—Object, Construction, and use of Automatic Feeds for First Breaker, Bramwell, etc.

The Construction and use of the several Kinds of Automatic Feeds for Second Breaker and Finisher, Apperly, Torrance Balling Head and Creel, Bates, Kemp, Scotch, etc.

Condensers, Rub Roll, Combination, Double Apron, etc.

Calculations for Proper Weight of Roving, Speeds, Productions, etc.

**Sample Carding.**—Each Student is required to make at least twenty Sample Mixes combining different colors and grades of Stock and to Felt and Mount the same. Part of the Carding to be done by Hand Cards and part on the Torrance Sample Mixing Card.

## WOOLEN MULE.

Principles of Spinning. History and development.

Hand Jack, Self-operating and Self Acting Mules. The Mule-head.

Method of Driving the various parts, Rolls, Spindles, Carriage, etc. Backing-off. Winding Mechanism.

Study of the Quadrant and Builder-rail. Regulation of the Fallers.

Double Spinning. Twisting on Mule and on Woolen Twister.

With the above lectures will be given all the necessary calculations and actual practice on the various machines.

## TOP MAKING.

**Carding and Preparing**—The principles of Worsted Carding—Types of Worsted Cards, Double Cylinder Lickerin, Breast, etc.

Speeds, Settings, Feeds, Adjustments, Productions.

**Preparing**—Differences between Carding and Preparing—What Wools are Prepared and why they are not Carded. The use of Emulsions. A Set of Preparers. The calculations for Drafts on any Gill Box. The Clough Gill Box.

The proper Drafts in Preparing—Adjustments, Speeds, Productions, Calculations, etc.

**Gilling after Carding**—Number of Doublings, etc.

**Combing**—The principles, history and development of Worsted Combing.

Combing on the Noble and Lister machines.

Calculations for Draft—Settings, Speeds, Productions, etc.

Per Cents. of Noil.

**Gilling after Combing**—Proper Drafts and calculations for Doublings.

**Back Washing**—The object and nature of the process—Back Washing Liquors, composition, Heat, etc.

The Hygroscopic property of Wool—Conditioning of Tops—Top Mixing.

## WORSTED DRAWING.

**Open Drawing or Bradford System**—The Principles of Drawing. Numbers of Operations for different Counts of yarn. The use of Logarithms in Drawing Calculations, Study of the Drag—Calculations for Drafts and Twists—Proper Ratch.

The functions of the Weigh Box.

Measuring Stop Motions, Candle Stick, Side Knock-off, etc.

Calculations for length.

Construction and use of Gauge Points or Constants.

Effect of Doubling.

The Dram and Hank Systems for numbering Roving.

**Cone Drawing**—The object and use of Cone Drawing—Differential Motions—Builder Motions—Calculations for Draft—Twist—Tension and Lay—Adjustment, Speeds and Productions.

**French Drawing**—The principles and use of French Drawing—Functions of the Porcupine. The principle of Condensing—Manufacture of Merino Yarns.

## WORSTED SPINNING.

The Principles of Spinning. Calculations for Draft and Twist—Spinning on the Cap—Flyer and Ring Frames—The Scaife Builder Motion—Drag in Bradford System of Spinning—The use of Straight Conical and Bell Mouthed Caps. Top Roll, Single and Double Covered, Iron and Wood.

Types of Frames, Leicester and Illingworth; Speeds, Productions, etc.

Principles of Worsted Mule Spinning.

## WORSTED TWISTING.

Principles of Twisting, Reeling, Weighing and Numbering of Single and Ply Yarns, Twisting on Cap, Flyer and Ring Frames—Calculations for Twist—Twist testing—Trap Twisters—Effect of direction of Twist; Speeds, Productions, Yarn Testing, etc.

The true difference between Woolen and Worsted Yarns. Layout of Machinery for different classes of Yarns—Power required for different Machines—Cost of Machinery and approximate labor cost of each Department, Sorting, Scouring, Carbonizing, Picking, Carding, Combing, Drawing, Spinning, Twisting, etc. for various classes of Yarns, Carpet, Braid, Botany, etc.

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## Designing Department

### GENERAL COURSE.

#### First Year.

Options:—Cotton, Woolen and Worsted Yarns.

#### 1. Design Lectures.

- Point or design paper.
- Intersections, interlacings and cut sections.
- Color effects.
- Reeds and setts.
- Different systems of counting reeds and yarns.
- Twills and diagonals.
- Drafting and reduction.
- Sateen weaves.
- Cut weaves.
- Combination of weaves.
- Spot weaves.
- Plain fabrics and fabrics on a plain basis.
- Names and explanations of different parts of cloth.
- Terms applied to weaves, etc., etc.
- Classifications of fabrics.

#### 2. Cloth Construction and Cloth Analysis.

Reproduction of fabrics, planning of patterns, drafts, chains, etc., etc., on paper, including yarn and cloth calculations as below:—

- Relative sizes of yarns.
- Grading of woolen yarns.
- Woolen yarn calculations.
- Methods of finding weights of various lengths of fabrics.
- Calculations for finding sizes of yarns of various denominations.
- Worsted yarn calculations.
- Cotton yarn calculations.
- Calculations for folded or ply yarns.

Calculations for converting one system of yarns into that of another.

Calculations for finding weight, counts or length of warp or filling from given data.

Calculations for reeds.

3. Practical work.

Color effects.

Combinations of colored threads.

Combinations of weaves.

Figured designing on plain ground.

Figured designing on twill ground.

Cut Diamonds.

Checkerboard effects.

Herring bone stripes.

Checked goods.

Colored goods, stripes.

Drafting of designs.

Designing from chains and drafts.

4. Practical work on hand looms putting into operation the principles taught in the foregoing course, including dressing, beaming, drawing in and reeding of warps.

## Second Year.

1. Design Lectures.

Twilling.

Fancy twills.

Point drafts.

Double, triple and alternate drafts.

Lined work.

Damasks.

Fancy stripes.

Sateen stripes.

Plain and irregular rib weaves.

Oblique rib weaves.

Basket weaves.

Corkscrew and double twill weaves.

Broken twills.

Backed cloths, filling and warp.

Double cloths.

Multiple ply fabrics.

Cloths ornamented with extra warp or filling.

Piques.

Bedford cords.

Marseilles quilting.

Fancy woolen cassimeres.

Figured blankets.

Crepes.

Trousering, suitings and coatings.

Carriage robes.

2. Cloth Construction and Cloth Analysis.

Calculations for harness straight, centred or point.

Calculations for shrinkage or contraction.

Calculations to find the number of ends per inch in order to use a given weight of warp, also picks per inch to use a given weight of filling.

Calculations on the proportioning of fabrics.

Construction of cloth.

Balance of cloth.

Amount of material used in the construction of fabrics.

Analysis consisting of cotton dress goods, gingham, fancy dress goods, backed and double cloths.

Calculations for complete specifications of backed and double cloths based upon the structure of cloth.

3. Practical work.

Cloth analysis and reproduction of fabrics, planning patterns, drafts, chains, etc., etc., on paper, including all necessary calculations for loom and finished cloth.

Analysis of fancy woolen and worsted cassimeres, woolen and worsted suitings, overcoatings, blankets, etc., etc. Original designing on all design lectures.

4. Lectures on Color.

Color theory.

Color applied to textiles.

Color values.

Combinations of colors.

Coloring of plaids and checks.

Coloring of suitings and trouserings.

Coloring of gingham and tartans.

Coloring of stripes.

Third Year.

1. Design Lectures.

Cotton velvets.

Corduroys.

Cotton pile fabrics, cut and uncut.

Figured Matelasse.

Shawls.

Cotton plushes.

Chinchilla.

Worsted and mohair mantle cloths.

Figured double plains.

Reversibles.

Ingrains.

Tapestries.

Cotton gauze.

Cotton leno.

Cotton lappet.

Jacquard designing.



Distribution of figures.

Determination of areas occupied by figures.

Jacquard figures formed by the warp or filling.

Figures not square.

Cloth formed by the combination of Jacquard gauze and fancy harness weaves.

Special designs for Jacquard gauze, and pile fabrics.

Jacquard pile and ordinary weaves.

Vestings.

Golfings.

The principles of designing; cloth structure and coloring best adapted to each of the above fabrics.

## 2. Cloth Construction and Cloth Analysis.

The structure and analysis of all descriptions of compound fabrics, viz:—backed, double, and various types of Jacquard figured fabrics, especially applicable to the cotton and worsted industries.

The cost of mixings and blends.

The cost of ply yarns.

The Metric system.

Calculations for woolen and worsted including the various processes of scouring, fulling and finishing.

## 3. Practical work.

Original designs on the foregoing lectures.

The complete analysis of a fabric.

## 4. Practical work on hand looms and putting into operation the principles taught in the foregoing course.

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# Decorative Art

As a knowledge of the principles of design decoration and color is necessary to the success of the textile industry, the Department of Decorative Art has been formed to fill this need and is included in the regular course.

One year course for all students—

Lecture on Historical Ornaments, Design and Color.

Practice in Free-hand drawing, Lettering, Design and Color.

Lecture on Historical Ornament will include Egyptian, Greek, Roman, Byzantine, Saracenic, Gothic and Renaissance Styles.

These lectures will be illustrated with the stereopticon.

The principles of design will be taught and practice will be given in applying these to problems.

The anatomy of pattern and the geometric basis of repeated design and the application of color will be included in this work.

Second year students taking design will be given advanced work on these same subjects.

Special class in drawing, painting and design for students not taking the other courses of the school.

This class is to provide instruction for students wishing to fit themselves to design textiles, wall-paper, book covers, leaded glass, silver, furniture, etc.

Also for those wishing to learn drawing and painting, either to become illustrators, portrait painters or decorators.

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## Chemistry and Dyeing Department

The regular course in Chemistry and Dyeing for day students extends through three entire school years, and is especially recommended to those who intend to enter any branch of textile coloring, bleaching, or the manufacture or sale of the various dye stuffs and chemicals used in the textile industry.

In addition to acquiring a thorough knowledge of the principles of all branches of dyeing, printing, bleaching, etc., the student by application, study, and conscientious performance of all the prescribed laboratory and practical work, should become proficient in the subject of Textile Chemistry, and the methods of testing the various dyestuffs, mordants, etc.

### GENERAL CHEMISTRY.

This subject is required of all students taking the regular course in Chemistry and Dyeing and all others intending to take up the study of Textile Chemistry and Dyeing later.

It will include lectures, recitations, and a large amount of individual laboratory work upon the following subjects, and will extend through one entire school year:—

#### Chemical Philosophy.

Chemical action, chemical combination, combining weights, atomic weights, chemical equations, acids, bases, salts, Avogadro's law, molecular weights, formulas, valence, periodic law, etc.

#### Non-Metallic Elements.

Study of their occurrence, properties, metallurgy, chemical compounds, etc.

#### Metallic Elements.

Study of their occurrence, properties, metallurgy, chemical compounds, etc.

#### The Hydrocarbons and their derivatives.

Study of their occurrence, properties, preparation, uses, etc.

#### Qualitative Analysis.

Before the completion of the course, the students will take up as thoroughly as the time will permit, the qualitative detection of the more common metals and non-metals, with practical work.

### QUALITATIVE ANALYSIS.

Qualitative Analysis will be studied by all regular students in course IV during the second term of the first year. The work will be based upon A. A. Noyes' Qualitative Chemical Analysis and will con-

sist of one lecture, one recitation, and not less than twelve hours laboratory work per week. The student must become familiar with the separations and the detections of the common metals and acids by the analysis of a satisfactory number of solutions, salts, alloys, pigments, etc. At intervals during the term, short laboratory tests will be given as well as the regular written examinations.

No pains will be spared to make the course as valuable to the student as possible and to encourage only thorough and intelligent work.

Students taking Course IV when sufficiently advanced, will take up the examination of various products with which the textile chemist must be familiar, such as testing mordanted cloths, pigments, and the various dyeing reagents.

During the latter part of this course a certain amount of time will be devoted to the preliminary operations of Qualitative Analysis, such as the precipitation and washing of such substances as barium sulphate, magnesium ammonium phosphate, calcium oxalate, etc., although no weighings or actual determinations will be made.

A student's marks in this subject will depend as much upon the neatness and care used in manipulation as upon the actual results obtained.

## STOICHIOMETRY.

This subject will be taken up by the chemistry and dyeing students during the second half of the first year.

The course will include a brief study of hydrostatics and the different methods of finding the specific quantities of solids and liquids. The application of the metric system will be thoroughly taken up, and problems will be worked by the students involving the expansion and contraction of gases, determination of empirical formulae, combining volumes of gases, quantitative analysis, etc.

## TEXTILE CHEMISTRY AND DYEING.

Under this head is included first, the lecture course in Textile Chemistry and Dyeing, which is taken by all regular diploma students, second, the general laboratory course taken by all regular diploma students, except those taking course IV, and the laboratory and practical work course which will be taken by the regular Chemistry and Dyeing or Course IV students.

### Outline of Lecture Course.

#### Technology of Vegetable Fibres.

Cotton, Linen, Jute, Hemp, China grass, etc. Chemical and physical properties, chemical composition, microscopical study, action of chemicals, acids, alkalies, heat, etc.

#### Technology of Animal Fibres.

Wool, Mohair, Silk, etc. Chemical and physical properties, chemical composition, microscopical study, action of chemicals, acids, alkalies, heat, etc.

## **Operations Preliminary to Dyeing.**

Bleaching of cotton and linen, wool scouring, bleaching, fulling and felting of wool, carbolizing, silk scouring and bleaching, action of soap.

## **Water and its Application in the Textile Industry.**

Impurities present, the methods of their detection, their effect during different operations, and methods for their removal or correction.

## **Mordants and other Chemical Compounds used in textile coloring not classified as dyestuffs.**

Theory of mordants, their chemical properties and their application, aluminum mordants, iron mordants, tin mordants, chromium mordants, organic mordants, tannin materials, sulphated oil, fixing agents, leveling agents, assistants, etc.

## **Theory of Dyeing.**

Chemical, mechanical, solution, etc.

## **Natural Coloring Matters.**

Origin, properties, application of indigo, log-wood, catechu or cutch, Brazil wood, cochineal, fustic, tumeric, madder, quercitron bark, Persian berries, etc.

## **Artificial Coloring Matter.**

General discussion of their history, nature, source, methods of manufacture, methods of classification, and their application to all fibres.

Special study of:—

Basic Coloring Matters.

Phthalic Anhydride Colors, including the eosins, phloxines, etc.

Acid Dyestuffs.

Direct Cotton Colors.

Sulphur Colors.

Mordant Acid Colors.

Insoluble Azo Colors, developed on the fibre.

Alizarine Colors, including other artificial coloring matters requiring a metallic mordant.

Deduction Vat Colors.

Aniline Black, artificial indigo, and other artificial dyestuffs not coming under the above heads.

## **Machinery Used in Dyeing.**

A certain amount of time will be devoted to the description of the machinery used in the various processes of textile coloring and this will be supplemented as far as possible by the use of charts, diagrams, lantern slides, etc.

## **Outline of Laboratory and Practical Work.**

Besides lectures and recitations upon this subject, those taking the regular day course in Chemistry and Dyeing will be required to do at least fifteen hours per week of practical laboratory work. By the performance of careful and systematic experiments the student will learn

the nature of the various dyestuffs and mordants, their coloring properties, their action under various circumstances and the conditions under which they give the best results. The more representative dyestuffs of each class will be applied to cotton, wool and silk, and each student will be obliged to enter in an especially arranged sample book, a specimen of each of his dye trials with full particulars as to conditions of experiment, percentage of compounds used, time, temperature of dye bath, etc.

For convenience and economy most of the dye trials will be made upon small skeins or swatches of the required material, but from time to time students will be required to dye larger quantities.

By the use of a small printing machine the principles of calico printing, and with the introduction of dyeing machines, vats, etc., the practical side of the subject will be studied, and it will be the constant endeavor of those in charge, to impart such information of a theoretical and scientific character as will be of value in the operation of a dye-house.

### **PHYSICAL CHEMISTRY.**

This subject will be studied during the third year.

It will include the principles of calorimetry, specific heat, vapor density, the various methods of determining molecular weights, laws of solution, electrolytic dissociation, theories of precipitation, thermochemistry, surface tension, etc. The student will be required to work out a large number of problems introduced by the subject.

### **ADVANCED INORGANIC CHEMISTRY.**

The whole subject of inorganic chemistry will be reviewed during the second half the second year, and many advanced topics will be introduced which were necessarily omitted from the first year course in General Chemistry.

### **ORGANIC CHEMISTRY.**

This subject, which was introduced during the latter part of first year general chemistry, will be continued during the whole of the second year as a special subject. The study will be taken up in a thorough manner and by the end of the year the student will understand the composition of the important artificial dyestuffs and the equations representing the reactions involved in their manufacture.

It will include lectures, recitations and laboratory work.

### **INDUSTRIAL CHEMISTRY.**

This subject will be taken up during the third year, particular attention being paid to those branches which are of special interest to the textile chemist, as oils, soaps, the gas and coal tar industry, building materials, and the manufacture of the important chemical compounds, acids, alkalies, bleaching powder, various mordants, etc., on a large scale.

The course will be illustrated as far as possible with the experiments, specimens, diagrams, and charts, and the students will be given an opportunity to visit some of the industrial establishments in the vicinity of Lowell and Boston.

### ADVANCED TEXTILE CHEMISTRY AND DYEING.

This will be a continuation of the Textile Chemistry and Dyeing of the second year, and will include a review of the second year's work, with the introduction of many advanced subjects; such as color matching, dye testing, calico printing, comparative dye trials, and the consideration of numerous problems that arise in the dye house.

The course will include a large amount of work in the dyeing laboratory and will be supplemented by trips to a number of the large dye houses and print works in the vicinity.

### MICROSCOPY.

The value of the microscope in the detection and examination of the various fibres cannot be over estimated, and often facts may be discovered, and conclusions drawn, which could be arrived at in no other way.

The students in this course will be given as much work with the microscope as time will permit. They will receive instructions in the use of the best microscopes made, and will not only have practice in the examination and detection of the fibres but will be required to become proficient in the preparation of permanent slides.

### QUANTITATIVE ANALYSIS.

This subject is taken up by all regular Chemistry and Dyeing students, and extends through the second and third years of the course.

During the second year, the principles of analytical work are thoroughly taught, the work being based on Talbot's Quantitative Chemical Analysis. Gravimetric analysis is studied during the first term, and volumetric analysis during the second term. The samples analyzed include salts, ores, minerals, bleaching powder, and alkalies. Frequent recitations are held for the discussion of methods and the solution of stoichiometrical problems. Students are encouraged to read the standard works and magazines on chemical subjects, in order to cultivate broad views of the science.

The third year work involves the analysis of water, alum, ammonia, soaps, coal, oils, indigo, tannin, and the ultimate analysis of organic compounds, as well as the examination of such substances as starches, gums, and other thickeners, detection of adulterants, etc.

No pains will be spared to give the students the benefits of all the latest researches along the lines of industrial analytical methods, and original work is encouraged in all.



## Power Weaving Department

The process of making pattern warps.

The construction and use of Spooling and Quilling Machinery for wool and cotton.

The construction and use of Warpers of various kinds.

Long and short chain systems of preparing warps and filling.

Sizing materials and size mixing machinery.

The Woolen Sizing Machine.

The Woolen Beamer.

Drawing-in and Twisting.

Operation of machines named above, and warp preparation in cotton, woolen and worsted, timed to correspond with the respective lecture.

The plain power loom and its construction.

Shedding by cams.

Variety of cams for different

Various pickers and picking motions.

grades of work.

Principles of Beating-up motion.

Force of lay.

Adjusting lag to various grades

Take up and let-off motions.

of cloth.

Minor adjustments of the power loom.

Plain looms as altered for weaving fancy cloth.

Looms constructed for several shuttles.

Drop box motions.

Different makes of box motions, applied to gingham weaving.

Chain building for box looms.

Automatic looms.

Shuttle changing looms.

Filling changing looms.

Shedding motions.

Single acting dobbies.

Double acting dobbies.

Spring boxes and other motions

Chain building for dobbies.

for returning harness.

Fan reeds.

Oscillating reeds.

Handkerchief motions.

Lappet motions.

Leno weaving.

Various shaker motions.

Centre selvedge motions.

Towel and other pile cloth weaving.

Open and close shed looms, for weaving various grades of woolen and worsted cloths.

Equal and unequal gear driven looms.

Lectures on Jacquard machinery.

Single lift Jacquards.

Double lift Jacquards.

Leno Jacquards.

Jacquards specially arranged for ingrain carpet work.

Tying up Jacquard harness.

Tapestry weaving, quilt weaving, etc.

Weave room engineering and equipment.

Cost of weave mill operation and statistics of operation.

## Finishing

Examination of cloth from the loom. Perching, Knotting, Burling, Mending, etc.  
Preparation of cloth for the Fulling Mill.  
Flocking and its purpose.  
Construction and use of the Soaping Machine.  
Use of soaps and alkalies for fulling and scoring purposes.  
Construction and use of various types of Fulling Mills and Stocks.  
Theory and method of fulling various classes of goods.  
Construction and use of various types of Washing Machines.  
Theory and method of scouring cloth before and after fulling.  
Cloth Carbonization.  
Hydro Extractors and their use.  
Construction and use of various types of Napping Machines.  
Construction of various types of Gigs.  
Crabbing and Singeing.  
Construction and use of various Starching and Water Proofing apparatus.  
Construction and use of various types of Tenting and Drying Machines.  
Construction of Single and Double Shears.  
Grinding and Setting Shears.  
Construction and use of the Steam Brush.  
Construction and use of Plate and Roller Presses.  
Method of finishing various classes of Woolen and Worsted goods.  
Cloth Examining, Measuring, Weighing, Ticketing, Numbering, Rolling, Baling, Casing and Shipping.  
Construction and use of the various machines necessary for this purpose. Testing apparatus, etc.  
All the necessary calculations for the various processes of finishing all classes of goods.

## Department of Engineering

### First Year—First Term.

Elements of Mechanics.	Gearing, Pitch of gears.
Force, Work, Power and Energy.	Belting problems.
Measurement of Work and Power.	Link motions.
Levers, Toggle joints, etc.	Harmonic motions.
Windlass, Pulley Blocks.	Cam design.
Inclined Plane and Wedge Screws.	
Worm and Wheel.	Builder motions.
Elements of Mechanism.	Mangle Wheel.
Angular Velocity.	Aggregate Combinations.
Speed Problems.	Epicyclic Trains.
Rolling Cylinders and Cones.	Differential Motions.

## First Year—Second Term.

Applied Mechanics.

Graphic Statics.

Strength of Materials.

Methods of Testing Materials.

In the above topics will be included as many problems as possible, dealing with the construction and maintenance of mills, not with the purpose of educating mill engineers, but rather to familiarize the student with the means at hand and processes employed in erecting structures for manufacturing, that they may study their government advantageously.

## Second Year—First Term.

Motive Powers

Water.

Steam.

Gas.

Water.

Head and Pressure.

Dams, Canals, etc.

Measurement of Quantity.

Types of Turbines.

Measurement of Power.

Governors.

Steam.

Elements of Thermodynamics as applied to Steam.

Types of Boilers.

Mechanical Stokers.

Fuels and Combustion.

Coal Consumption.

Chimneys and Mechanical

Boiler Test.

Draft.

Steam Engine.

Simple, Compound and Triple

Plain slide valve.

Expansion.

Corliss and Cam Gears.

Condensers and Condensing

Governors.

engines.

Steam Turbines.

Use of exhaust steam for heating and dye house purposes.

Indicator.

Construction of and use in measuring power and setting valves.

Engine test.

Practical use of indicator and computation of indicator diagrams.

Reducing motions and wheels.

Gas.

Theory and general principles of gas engines.

Types of explosion and internal combustion engines.

Governing devices. Throttling and Hit and Miss type. Igniting devices.

Consumption of gas and costs.

## Second Year—Second Term.

### ELECTRICITY.

Elementary Electricity.

Magnetism.

Electrical Measuring Instruments.

Dynamo Electric Machines.

Electric Lamps.

Principles of Alternating Currents.  
Alternating Current Apparatus.  
Electrical Power Transmission.  
Electrical Testing.

In addition to the lectures and recitations in physics, electricity and steam engineering all regular students in the Textile Engineering course will have laboratory practice in the testing of fibres, yarns and fabrics and practical tests on steam and gas engines, motors, generators, etc. They will also spend additional time on advanced mechanism and machine drawing problems in the drawing room.

### Third Year.

Mill Construction. Calculations and drawings of modern mill buildings.

Distribution of power and methods of driving machinery.

Mill Fire Protection.

Mill Heating and Ventilation.

Mill Humidifying.

Several courses of lectures on allied subjects by outside lecturers will be added.

## MECHANICAL AND MACHINE DRAWING.

### First Year.

Care and use of Instruments. Sketching from machine details.

Geometrical Constructions. Working Drawings.

Elements of Projections. Tracings.

Isometric Drawings. Blue Print Process.

The regular day students in Textile Engineering will spend a large amount of time in the drawing room on practical mill engineering problems, including construction drawings, machinery layouts, power transmission, etc.

### Second Year—First Term.

Mechanism problems. Drawing in connection with course in Mechanism, such as cams, gearing problems and other mechanism designs.

### Second Term.

Practical sketching from machines for working detail and assembly drawings.

# Evening Classes

The courses of instruction offered in the evening are similar to those of the day; but less time is devoted to the machine or laboratory work, since, in most cases this is of small moment; ordinarily the handling of the machinery is a part familiar to most of the students through contact with it in the day time, and in such cases the explanations and calculations are of the greater importance. In some cases it is possible to pursue two courses together, but this depends always on the arrangement of the schedule for any particular year.

The evening courses are free to graduates of the Evening High and Drawing Schools, operatives of the mills and machine shops, and other residents of Lowell, to such members as may be accommodated in the order in which they are received.

Graduates of other schools, will be received on presentation of proper credentials; for all others, examinations will be held on Thursday, Sept. 21, at 7 p.m. at the School. The candidates must be familiar with the English language, and the principles of arithmetic; for the first part, a short composition must be written on a given theme, and a certain amount must be written from dictation, while in the latter will be included addition, decimals, fractions, percentage, ratio and proportion.

## Subjects

The list of subjects embraced in each course is similar to that of the day and may be found beginning at page 60.

## Certificate

With the honorable and satisfactory completion of either of the regular evening courses in any subject, the certificate of the School will be awarded.

### Course I, Cotton Spinning.—3 Years

Fee for all except residents of Lowell, \$2.50 per term, \$5.00 per year.

### Course II [A], Woolen Spinning.—1 Year

### Course II [B], Worsted Spinning.—2 Years.

Fee for all except residents of Lowell, \$2.50 per term, \$5.00 per year.

### Course III, Designing.—3 Years.

Fee for all except residents of Lowell, \$2.50 per term, \$5.00 per year.

### Course IV, Chemistry and Dyeing.—4 Years

Fee for all except residents of Lowell, \$2.50 per term, \$5.00 per year. A deposit of \$5 will be required from all who take this course, whether

residents of Lowell, or not, to cover the cost of the laboratory break-ages; at the end of the year any unexpended balance will be returned, or an extra charge made as the case may be.

#### **Course V, Weaving.—2 Years**

Fee, free to residents of Lowell, \$2.50 per term, \$5.00 per year.

#### **Course VI, Mechanics and Electricity.—2 Years**

Fee \$2.50 per term, \$5.00 per year. Free to residents of Lowell.

#### **General**

The schedule showing the arrangements of classes for each term will be announced at the opening of each term.



## Teachers

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### Engineering.

- Wm. W. Crosby, S.B., M.E., chief instructor. Massachusetts Institute of Technology, 1893, and assistant instructor mechanical engineering afterward. Experience: superintendent power and plant, Otis Allen & Son, Lowell. Mr. Crosby is also principal of the school.
- George H. Perkins, S.B., instructor in mechanics and mechanical engineering. Massachusetts Institute of Technology, 1899. Experience: draftsman Ludlow Manufacturing Company.
- Charles H. Eames, S.B., instructor electrical engineering and mathematics; is also secretary of the school. Massachusetts Institute of Technology, 1897. Experience: superintendent Light, Heat and Power Company, Lowell, and assistant superintendent with Stone & Webster, electrical engineers, Boston, Mass.

### Chemistry and Dyeing.

- Louis A. Olney, A.C., chief instructor. Lehigh University, 1896. Experience: instructor Brown University.
- G. Carl Spencer, S.B., instructor in chemistry. Worcester Polytechnic Institute, 1897.
- Miles R. Moffatt, A.B., S.B., instructor in chemistry. Columbia University, 1901. Experience: Mallinckrodt Chemical Works, St. Louis, Mo.
- Herbert F. Schwarz, instructor in dyeing. University of Dublin. Associate of Royal College of Science for Ireland. Experience: with Levinstein & Co., dye stuffs and chemicals, Manchester, Eng.
- H. A. Matteson, A.B., instructor in dyeing. Brown University, 1897. Experience: Silver Springs Dye Works and Bleaching, Providence, R. I., five years.

### Decorative Art.

- Vesper L. George, chief instructor. Pupil of the Julian Academy, Paris. Experience: instructor State Normal Art School, and principal Evening School of Design, Boston, Mass.
- Ida A. Woodies, instructor. Lowell Textile School, 1900. Pupil of Dr. Denman W. Ross, lecturer in design, Harvard University.

## Design.

Fenwick Umpleby, chief instructor. Honors graduate textile department, Victoria College, Leeds, Eng., 1884. Experience: chief designer, Gilbert Manufacturing Company, Massachusetts, and Globe Worsted Mills, New York.

Everett A. Jones, instructor in hand loom weaving. Phillips Academy; Lowell Textile School, 1904. Experience: at Aiken, Franklin Woolen and Squam Lake Woolen mills.

Arthur F. Ferguson, instructor. Lowell Textile School, 1903. Experience: Chapman, Kendal & Daniels, wholesale dry goods, Boston, Mass.

Martha B. Balmforth, instructor. Lowell Textile School, 1903. Experience: assistant designer, Talbot Mills, North Billerica, Mass.

## Cotton Yarn.

Stephen E. Smith, chief instructor. Lowell Textile School, 1900. Experience: draftsman, Lowell Machine Shop, and at Atlantic Cotton Mills and Shaw Stocking Company.

Arthur L. Willey, instructor. Experience: overseer, principally in carding, eight years at Palmer, Moosup, Samoset and New England cotton yarn companies.

## Woolen and Worsted Yarns.

Edgar H. Barker, chief instructor. Massachusetts Institute of Technology, 1896. Experience: Pacific Mills five years; E. Frank Lewis, wool scourer, one year.

Frank W. Emerson, instructor. Lowell Textile School, 1903. Experience; Crescent Woolen Company and Rutter Bros., Lawrence.

## Warp Preparation and Power Weaving.

William Nelson, chief instructor. Harris Institute, Preston, Eng.; certificate of City and Guilds Institute, London, Eng. Experience: Springfield and Alexandria Mills, Preston; overseer, Jacquard Weaving North Manufacturing Company, Chorley, Eng., and Ponemah Mills, Taftville, Conn.

Edward Nelson, instructor. Evening course, New Bedford Textile School. Harris Institute, Preston, Eng., 1889. Experience: Springfield and Bristol Mills, Preston, Eng., and overseer Chenango Silk Company, New York.

Joseph Wilmot, instructor. Experience: loom fixer, U. S. Bunting Company.

### **Finishing.**

Arthur A. Stewart, chief instructor. Lachine Academy, Canada; Lowell Textile School, 1900. Experience: Dominion Woolen Manufacturing Company, Montreal, Can.; Bay State, American Woolen and Nonatum manufacturing companies.

### **Commercial Languages.**

Paul E. Kunzer, Ph.D., chief instructor. New England College of Languages, Boston.

# Register of Day Students

1904-1905.

## Third Year.

Name	Course	Address
Adams, Henry S.	I	Haverhill, Mass.
Arundale, Henry B.	II	Lawrence, "
Boyd, George A.	I	Oakdale, "
Brooks, Joseph H.	I	Haverhill, "
Carr, George E.	I	Adams, "
Cole, Edward E.	IV	Haverhill, "
Cole, James T.	II	Medford, "
Dillon, James H.	III	Belchertown, "
Halsell, Elam R.	III	Lowell, "
Harris, Charles E.	I	Easthampton, "
Hollings, James L.	I	Dorchester, "
Hook, Russell W.	IV	West Medford, "
Jones, Everett A.	II	Lowell, "
Lee, William H.	II	Holyoke, "
Lewis, Walter S.	IV	North Woburn, "
Marra, Wm. J.	III	Holyoke, "
McKenna, Hugh F.	IV	Woburn, "
Midwood, Arnold J.	IV	Lowell, "
Moore, Everett B.	I	Lynn, "
Parker, Everett N.	I	Lowell, "
Rothschild, E. J.	I	New Orleans, La.
Thompson, Everett L.	I	North Woburn, Mass.
Warren, Philip H.	II	Worcester, "
Wightman, William H.	IV	Lawrence, "
Wilson, W. E. H.	I	Lowell, "

## Second Year.

Name	Course	Address
Abbott, Guy S.	II	No. Reading, Mass.
Barnet, Willis G.	II	Albany, N. Y.
Bigelow, Edward A.	II	Worcester, Mass.
Bradford, Roy H.	II	Lowell, "
Brookhouse, Albert L.	IV	Salem, "
Buttery, Henry I.	II	Waterloo, N. Y.
Cheney, Harold W.	III	Clinton, Mass.
Church, Charles R.	II	Lowell, "
Churchill, Charles W.	III	" "
Cook, Cheney E.	II	" "
Currier, Herbert A.	I	Somerville, "
Curtis, Frank M.	I	Roxbury, "
Curtis, William L.	II	" "
Duncan, Robert C.	IV	Woburn, "
Edwards, Charles B.	II	Haverhill, "

Name	Course	Address
Fleming, Frank E.	IV	Lowell, Mass.
Gahm, George L.	II	Jamaica Plain, "
Hadley, Walter E.	IV	Lowell, "
Hennington, Arthur J.	II	Dorchester, "
Hildreth, Harold W.	II	Westford, "
Hintze, Thomas	I	East Boston, "
Irish, Wm. F.	II	Lowell, "
Jackson, Wm. C.	IV	" "
Joel, Carl B.	II	Fitchburg, "
Julia, Robert A.	III	Lisbon Centre, Me.
Kent, Clarence L.	III	Lawrence, Mass.
Lane, John W.	I	Wakefield, "
Mackay, Stewart, Jr.	III	No. Chelmsford, "
McCleery, Walter L.	IV	Lowell, "
McDonald, Joseph S.	II	Bradford, "
McDonnell, William H.	I	So. Boston, "
Morris, James J.	IV	Lowell, "
Newcomb, Guy H.	IV	Fitchburg, "
Prior, Everett L.	II	Malden, "
Roberson, Pat H.	I	Lowell, "
Shaw, Benj. C.	I	" "
Stohn, Alexander C.	III	" "
Swan, Guy C.	II	Lawrence, "
Taylor, Harry C.	II	Lowell, "
Thomas, Roland V.	I	Boston, "
Varnum, Arthur C.	II	Lowell, "
Wheelock, Stanley H.	II	Uxbridge, "
Wood, Herbert C.	I	Lowell, "
Woodruff, Charles B.	I	Boston, "
Wright, Edward Jr.	II	Lawrence, "

#### First Year.

Name	Course	Address
Abell, Frederick T.	II	Lawrence, Mass.
Avery, Charles H.	II	Newtonville, "
Bain, William A.	IV	Sabattus, Me.
Barron, Christopher T.	Engineering	Lawrence, Mass.
Bicknell, Karl	IV	Lowell, "
Brownell, P. R.	III	Fitchburg, "
Burke, William A.	Eng.	Lowell, "
Campos, Guy J.	II	" "
Churchill, Edwin Jr.	Eng.	Lawrence, "
Craig, Albert W.	IV	" "
Dearing, Melville C.	IV	Haverhill, "
Eames, Alden N.	IV	Wilmington, "
Eaton, Bruce	I	Woburn, "
Ehrenfried, Jacob B.	III	Boston, "
Farmer, Chester J.	IV	Andover, "

Name	Course	Address
Frost, John R.	I	Clinton, Mass.
Grant, Harold	II	Worcester, "
Hanscom, Lester H.	II	Lawrence, "
Haskell, Spencer H.	III	Worcester, "
Hathorn, George W.	IV	No. Andover, "
Hayes, Ralph H.	IV	Dover N. H.
Hinds, Horace	I	Lowell, Mass.
Hoyt, Charles W.	IV	" "
Huntington, Fred W.	IV	Montpelier, Vt.
Hylan, John B.	II	Lowell, Mass.
Kane, John W.	III	" "
Kinne, Roy W.	I	Housatonic, "
Knowland, Daniel P.	IV	Marblehead, "
Lawrence, Levi	III	Fitchburg, Mass.
Lee, Frank H.	IV	Lawrence, "
Mayo, George E.	II	Foxcroft, Me.
McCluskey, Henry J.	Eng.	Lowell, Mass.
Merriman, Earl C.	II	Shirley, "
Morrill, Manley G.	III	Lowell, "
Norris, Daniel	II	Woburn, "
O'Brien, James	I	Lowell, "
O'Hearn, John A.	Eng.	Lawrence, "
Opitz, Charles H.	I	No. Adams, "
O'Riordan, Andrew	Eng.	Lowell, "
Peixoto, Edgard R.	I	" "
Possner, Albert W.	II	Edgewood, R. I.
Putnam, Burleigh	I	Lowell, Mass.
Raymond, Charles A.	IV	Essex, "
Reardon, John F.	IV	No. Billerica, "
Reardon, John S.	Eng.	Lowell, "
Shea, Daniel J.	IV	Fitchburg, "
Sill, Walter G.	II	East Orange, N. J.
Southgate, Herbert R.	II	Worcester, Mass.
Storer, Francis E.	II	West Roxbury, "
Stott, Charles H.	IV	Lawrence, "
Stursburg, Paul W.	II	Lowell, "
Stursburg, Albert H.	II	" "
Taylor, Ralph E.	II	Worcester, "
Walker, William Jr.	II	No. Hartland, Vt.
Wiggin, Leon M.	II	Lowell, Mass.
Wilson, Ralph A.	Eng.	" "
Woodcock, Eugene C.	III	Lawrence, "

### SPECIALS.

Name	Year	Course	Address
Burns, E. J.	2	IV	Lowell, Mass.
Burns, J. E.	2	IV	" "
Conklin, Jennie G.	2	IIIb	" "



Name	Year	Course	Address	
Donnellan, Frank T.	3		Lowell, Mass.	
Fowler, Alma E.	1	IIIb	"	"
Gibbs, Charlotte M.	1	IIIb	Cambridge,	"
Gillon, Sadie A.	2	IIIb	Lowell,	"
Hanlon, Margaret	1	IIIb	"	"
Hunt, Chester L.	3	III	"	"
Meador, Charlotte M.	2	IIIb	"	"
Meek, Lotta	2	IIIb	"	"
Pevey, John F.	3	III	"	"
Roberts, Carrie I.	3	IIIb	"	"
Robertson, Norval	1	IV	"	"
Staples, Annabel H.	1	IIIb	"	"

# Register of Evening Students

1904-1905.

## Fourth Year.

Name	Course	Address
Hunton, Lewis G.	IV	Lowell, Mass.
O'Neill, Peter F.	IV	Lawrence, "
Silk, Frederick C. M.	IV	Lowell, "
Tonge, John	IV	Lawrence, "

## Third Year.

Name	Course	Address
Bagshaw, Arthur H.	IV	Lowell, Mass.
Bake, Herbert	III	Andover, "
Brown, James P.	III	Lowell, "
Burke, Thomas F.	I	" "
Caron, Cleophas	I	Lawrence, "
Cook, Cheney E.	III	Lowell, "
Dick, Hugo P.	III	Lawrence, "
Dimlick, Benj. C.	III	" "
Eyers, John T.	IV	Lowell, "
Foster, Sherwood L.	I	" "
French, Ernest J.	I	Lawrence, "
Gay, Earle B.	I	Lowell, "
Gray, John	III	" "
Halsell, Elam R.	III	" "
Haven, George W.	III	Melrose Highlands, "
Julia, Robert A.	III	Lowell, "
Kelley, Thomas F. J.	IV	Lowell, "
Kenworthy, Joseph	I	" "
Kidd, Thomas E.	IV	" "
Lang, Mary D.	IV	" "
Lord, Wilfred	IV	Lawrence, "
Mason, Robert	III	Lowell, "
McCarthy, Joseph F.	III	Lawrence, "
Molley, Andrew	III	Lowell, "
O'Brien, David A.	IV	" "
Peel, John	III	No. Andover, "
Roberson, Pat H.	I	Lowell, "
Skinner, Clarence W.	III	Methuen, "
Smith, Wm. E.	III	" "
Smith, George A.	III	" "
Smith, Arthur	III	Lawrence, "
Stopherd, William H.	III	Lowell, "
Wheelock, Stanley H.	III	" "

# Second Year.

Name	Course	Address
Abbott, Paul W.	I	Lowell, Mass.
Alister, James S.	III	" "
Barry, S. Francis	V	Lawrence, "
Barry, Edward J.	I	" "
Bastow, Henry	V	" "
Bastow, Stephen W.	IV	Nashua, N. H.
Bignall, Mrs. F. A. P.	III	Billerica, Mass.
Bowie, Alexander O.	VI	Lawrence, Mass
Bowie, Samuel A.	VI	" "
Boyd, George A.	IV	Lowell, "
Brouder, John J.	III	Lawrence, "
Bryant, Ernest L.	VI	Lowell, "
Burnham, Joseph W.	III	Lawrence, "
Callahan, Patrick A.	VI	" "
Campos, Guy J.	III	Lowell, "
Church, Charles R.	IV	" "
Collins, John A.	IIb	Brighton, "
Conley, Patrick J.	III	Lowell, "
Custer, James J. E.	V	" "
Curtis, William L.	II	" "
Dana, Clarence A.	VI	" "
Davis, Samuel J.	VI	" "
Dillon, James H.	II	" "
Donovan, Caroline E.	V	" "
Duce, Benj.	III	No. Andover, "
Duggan, Francis P.	VI	Lowell, "
Earle, Edward M.	VI	" "
Eastwood, John H.	VI	Lawrence, "
Elers, Henry Y.	II	Lowell, "
Erbe, Gustave	VI	Lawrence, "
Eyers, Walter H.	III	Lowell, "
Freeman, Frederick E.	III & IIb	Lawrence, "
Gay, Earle B.	I	Lowell, "
Goodchild, George	VI	" "
Hanglin, Albert J.	IV	" "
Harder, Elmer E.	VI	" "
Harris, Maurice E.	VI	Lowell, Mass.
Hebert, Charles L. J.	IV	" "
Hefferon, John	VI	Lawrence, "
Helliwell, William E.	III	No. Andover, "
Hoessler, Carl	III	Collinsville, "
Holt, Gavin	IV	Lowell, "
Holt, Luther Jr.	I	" "
Hoole, William H.	IV	" "
Houle, Augustus E.	IV	" "
Howard, Thomas	V	" "
Hunt, Herbert R.	VI	" "
Jeffery, Ephraim	V	" "

Name	Course	Address
Jones, Everett A.	II	Lowell, Mass.
Johnson, Henry C.	III	" "
* Johnson, William E.	I	Lawrence, "
Kane, John W.	III	Lowell, "
Kimball, Irving D.	VI	" "
Krebs, Charles G.	IV	Roslindale, "
Laffert, August	III	Lawrence, "
Lamson, George F.	VI	Lowell, "
Lang, Mary D.	IV	" "
Lang, William A.	I	" "
Leith, Albert F.	VI	" "
Linkletter, Alfred C.	VI	" "
Lovell, Charles E.	VI	" "
Maguire, James H.	VI	" "
McManus, Hugh	V	" "
Martin, John C. Jr.	IIb	" "
Michelmores, Harry	III	Lawrence, "
Moody, George H.	VI	Lowell, "
Myers, John Y.	V	" "
Myers, James W.	V	" "
Nelson, Ernest H.	III	" "
Noble, John T.	IV	" "
Notman, Frederick W.	V	Jamaica Plain, "
O'Brien, George	I	Lowell, "
O'Neil, Charles F.	VI	" "
O'Neil, John H.	VI	" "
Overend, John	V	Lawrence, "
Owens, Terrence F.	I	Lowell, "
Parker, Herbert S.	VI	Lawrence, "
Pedlar, William A.	I	Methuen, "
Pihl, Christian E.	VI	Lowell, "
Pihl, Victor E.	VI	" "
Reardon, Timothy H.	VI	" "
Redman, H. Stewart	V	" "
Ring, George R.	IV	" "
Rolfe, Francis A.	II	" "
Sargent, Herbert L.	III	Lawrence, "
Simola, Emil J.	IIb	Lowell, "
Stevens, Frank W.	VI	" "
Stiles, Joseph W.	VI	" "
Talbot, Frank R.	VI	" "
Whitworth, Albert	II	" "
Wilder, Clifford W.	IV	No. Billerica, "
Wholey, William P.	I	Lowell, "
Wilson, Eric H.	VI	" "
Wiswall, Frank T.	V	Lawrence, "

\* Deceased.

# First Year.

Name	Course	Address
Abell, Frederick T.	II	Lawrence, Mass.
Adler, Oscar A.	V	Lowell, "
Angers, Alfred	VI	" "
Arnold, Richard H.	VI	" "
Arvidson, Carl	IV	" "
Aspin, James T.	V	" "
Avery, Charles H.	II	" "
Bachelor, Carl F.	I	" "
Baker, Albert	V	" "
Bamford, Frank	V	" "
Barbin, Hilaire	VI	" "
Barker, John P.	III	" "
Barnes, Royal F.	I	" "
Barnet, Willis G.	I	" "
Barrett, Olava	V	" "
Barrington, James L.	IV	Lawrence, "
Barry, William T.	VI	" "
Bassett, Thomas F.	VI	Lowell, "
Bauer, John L.	III	" "
Bell, Frederick Wm.	II	" "
Benard, Andre H.	VI	" "
Bennett, Coolidge J.	VI	" "
Bennett, Roy J.	VI	" "
Berryman, James	III	Fitchburg, "
Bigelow, Edward A.	II	Lowell, "
Bishop, Warren A.	VI	" "
Blanchard, George W.	II	No. Andover, "
Blanchette, Eugene	III	Lowell, "
Boileau, Edward J.	VI	" "
Bolles, Matthew	III	Lawrence, "
Boule, Lazare	VI	Lowell, "
Bourget, Richard	VI	Lawrence, "
Bowker, Albert B.	III	" "
Bowles, Charles C.	II	Lowell, "
Brady, Joseph A.	VI	" "
Brassard, Adolphe	I	" "
Breare, Joseph	VI	" "
Brennan, William P.	VI	" "
Brimigion, Caleb	VI	" "
Brown, Hector	III	" "
Brown, John L.	I	" "
Brown, Walter P.	VI	" "
Brown, William G.	II	" "
Bruckner, Carl L. G.	II & V	" "
Buckley, Harold S.	VI	Lawrence, "
Buckley, Harry	IV	" "
Bullock, Merrill E.	VI	Lowell, "
Bunker, Gordon	I	" "

Name	Course	Address
Burk, Daniel J.	IV	Lowell, Mass.
Burke, Francis T.	V	" "
Burke, Thomas F.	III	" "
Burns, David A.	II	Lawrence, "
Burns, Norbert	VI	Lowell, "
Burns, Rossi P.	I	" "
Callahan, Daniel F.	VI	" "
Callahan, John	II	" "
Campbell, Archibald	IV	" "
Carberry, Joseph A.	VI	Lawrence, "
Carignan, Dana	V	Lowell, "
Carlin, James J.	VI	" "
Carlson, John S.	VI	" "
Caron, Eugene	V	" "
Carroll, John J.	VI	" "
Cashin, Arthur H.	II	" "
Cassidy, F. J.	VI	" "
Caverno, Charles B.	VI	" "
Chapdelaine, Rudolph	VI	" "
Chase, Leo W.	VI	" "
Cheetham, James A.	VI	" "
Cheetham, John J.	IV	" "
Clark, Ralph L.	III	" "
Cochrane, George L.	IV	" "
Cole, John H.	VI	" "
Collins, Frank J.	VI	" "
Collins, James O.	V	" "
Collins, John A.	II (a & b)	Brighton, "
Collins, Joseph J.	VI	Lowell, "
Condon, Garrett J.	VI	" "
Condon, Michael	II	" "
Conley, Fred A.	I	" "
Connelly, Patrick	II	Collinsville, "
Connerton, Michael J.	VI	Lowell, "
Cook, Walter E.	III	" "
Cooney, Charles P.	IV	" "
Corr, James F.	V	" "
Cosgrove, Martin J.	III	" "
Cote, Andrew	V	" "
Coughlin, Daniel A.	VI	" "
Coulombe, Alberic	V	" "
Coulter, William E.	V	" "
Cowdrey, Charles E.	III	No. Billerica, "
Craib, William W.	VI	Lowell, "
Crilley, Arthur L.	VI	Lawrence, "
Crowley, William A.	I	Lowell, "
Crowley, William L.	V	" "
Cunningham, Walter E.	IV	" "
Dailey, Dennis	V	" "
Dalton, John	V	" "



Name	Course	Address	
D'Anjou, Arthur	I	Lowell, Mass.	
Davidson, Alexander	V	"	"
Davis, Henry F.	VI	"	"
Davis, Mark C.	III	"	"
Deghan, Thomas A.	V	"	"
Delmage, Edward R.	V	"	"
Denrarkowski, John	I	"	"
Desforge, Edward A.	VI	"	"
Desormaux, Hervey A.	VI	"	"
Devine, William P.	VI	"	"
Dimlick, William F.	IV	Lawrence,	"
Dodge, Frank	I	Lowell,	"
Donahue, Walter F.	V	"	"
Donlon, Thomas F.	III	Collinsville,	"
Donnelly, Joseph	II	Lowell,	"
Donovan, Gerald	I	Lawrence,	"
Downs, Patrick J.	V	Lowell,	"
Drainville, Aime	III	"	"
Dresser, Welcome W.	VI	"	"
Drolet, Henry E.	VI	"	"
Duckworth, John	VI	"	"
Dudley, William J.	VI	"	"
Dulligan, Charles E.	VI	"	"
Dundon, Lawrence G.	V	"	"
Dunham, Harrison Jr.	I	Roslindale,	"
Dunsford, Harry	VI	Lowell,	"
Dupress, Alfred E.	V	"	"
Dupuis, Edward A.	I	"	"
Durstthoff, Charles C.	IV	"	"
Dwyer, George W.	V	"	"
Dwyer, Louis H.	V	"	"
Eastwood, John H.	VI	Lawrence,	"
Edmond, Chester M.	VI	"	"
Eldred, Calvin P.	IV	Lowell,	"
Elers, Henry Y.	II	"	"
Emerson, Everett B.	VI	"	"
Eno, William	I	"	"
Evangelos, Dennis J.	VI	"	"
Fairbanks, Lester V.	VI	"	"
Farley, Frank E.	VI	"	"
Farquhar, Fred	III & V	Lawrence,	"
Farr, Clayton F.	I	Lowell,	"
Farrell, William C.	VI	"	"
Fenton, William P.	II	"	"
First, William H. R.	II	"	"
Flannery, Peter P.	II	"	"
Flint, Leon G.	III	Lawrence,	"
Foley, George M.	V	Lowell,	"
Foley, Maurice A.	II	"	"
Ford, Carl B.	VI	"	"

Name	Course	Address
Forsythe, George	VI	Lowell, Mass.
Fortier, Quincy E.	I	" "
Foss, Samuel C.	III	Methuen, "
Foster, George W.	IV	Lawrence, "
Frawley, John P.	VI	Lowell, "
French, Roy C.	VI	" "
Fulton, John	V	" "
Gagan, John H.	II	" "
Gagne, Joseph E.	VI	" "
Gagnon, Adolphe,	VI	" "
Garrick, Frank C.	VI	" "
Garrigan, Philip J.	VI	
Garvin, James	III	Lowell, Mass.
Gauthier, George W.	II	" "
Gaynor, George	V	" "
Gelineau, Emilean E.	IV	
George, William S.	IV	Nashua, N. H.
Gifford, John H.	I	Lowell, Mass.
Gilchrist, David	II	" "
Gillan, Charles	V	" "
Gilligan, James F.	VI	" "
Gilman, Edward T.	VI	" "
Glispin, Charles F.	V	" "
Golding, Thomas	II	" "
Gorham, Charles E.	II	" "
Green, Henry F.	VI	" "
Green, Walter W.	VI	" "
Greene, James B.	III	" "
Grenier, Emmanuel J.	VI	" "
Griffin, John J.	VI	Lawrence, "
Groesbeck, Leonard C.	VI	" "
Guertin, Adelard	II	Lowell, "
Gustafson, Ernest	VI	" "
Hadley, Walter E.	VI	" "
Hall, John	V	" "
Halliwell, Ernest H.	VI	Lawrence, "
Halloran, Daniel C.	VI	Lowell, "
Hallowell, Edward	II	" "
Hammel, Eugene	V	" "
Hanlon, David A.	III	Dracut, "
Hardman, David B.	IV	Lowell, "
Harrington, Patrick H.	V	" "
Hart, Eli B.	V	" "
Hartwell, Henry E.	VI	Lawrence, "
Harvey, Reginald	VI	" "
Haseltine, Philip W.	I	" "
Heap, John R.	VI	Lowell, "
Hedrick, Clifton F.	VI	" "
Heeley, George	V	" "

Name	Course	Address
Henderson, Harry J.	VIeering	Lawrence, Mass.
Hickson, Frank A.	VI	Lowell, "
Higgins, James A.	V	No. Billerica, "
Hogan, James P.	V	Lowell, "
Holt, Sumner S.	I	" "
Houde, Apollinaire	V	Lawrence, "
Houston, William J.	II	" "
Howard, Ralph M.	VI	" "
Howorth, Thomas E.	I	Lowell, "
Hoyle, Joseph	II	" "
Hultin, Arthur F.	V	" "
Hunt, Chester L.	II	" "
Hurley, William J.	VI	" "
Hutton, Harold	V	" "
I'Anson, John	V	" "
Ingram, Ralph	III	" "
Irwin, John S.	IV	" "
Jackson, Hugh	V	Lawrence, "
Jasper, Joseph C.	VI	Lowell, "
Jenkins, Albert L.	II	" "
Jennings, John J.	I	" "
Jepson, Harry	VI	" "
Johnson, Amanda C.	III	" "
Johnson, Charles	VI	Methuen, "
Jones, Frederick P.	V	So. Lawrence, "
Joubert, James B.	III	Lowell, "
Kane, John W.	II	" "
Keene, Thomas R.	VI	" "
Kelly, Michael H.	III	" "
Kelley, John J.	VI	" "
Kelley, Joseph P.	V	" "
Kennedy, Fred	II	" "
Kent, Charles H.	V	Lawrence, "
Kent, Ernest J.	VI	" "
Kenyon, Francis B.	II	Lowell, "
Keyes, Joseph P.	IV	" "
Kilborne, Clarence P.	VI	Lawrence, "
Kirkland, Sinclair	VI	Lowell, "
Kirschenbaum, Elimelech	II	" "
Kivlan, William F.	V	" "
Knox, Henry	V	" "
Knox, William J.	VI	" "
Kohler, J. Frank	VI	Lawrence, "
Landry, Arthur	VI	Lowell, "
Landry, Ernest	V	" "
Landry, George	VI	Lawrence, "
Lane, George F.	V	Lowell, "
Laporte, Arthur	VI	" "
Lavergne, Arthur J.	VI	" "
Leblanc, Pierre, Jr.	I	" "

Name	Course	Address
LeCam, John	I	Lowell, Mass.
Leighton, Carl	IV	" "
Leith, Robert W.	III	" "
Le Lacheur, Arthur	III	" "
LeLacheur, Frederick T.	VI	" "
Lesser, Adolf	IV	" "
Liebstran, Richard	III	Lawrence, "
Lightbown, Claude L.	II	Lowell, "
Lindsey, James B.	III	Lawrence, "
Lippe, Celas	VI	Lowell, "
Lodge, Albert	VI	Methuen, "
Loiselle, Yvonne M.	III	Lowell, "
Lorenz, Albert	IV	Lawrence, "
Lovering, Ernest E.	VI	Lowell, "
Lucier, Homer J.	I	" "
Lunn, Enoch A.	VI	" "
Lynch, George	II	" "
Lynch, Patrick A.	V	" "
Lynch, Peter	V	" "
MacAdam, Anthony H.	VI	" "
Maguire, Charles J.	VI	" "
Maguire, James H.	VI	" "
Maloney, Benj. J.	III	" "
Mangan, John T.	VI	" "
Mansfield, Arthur	V	Collinsville, "
Marjerison, T. Sydney	III	Lawrence, "
Marquis, Joseph	V	Lowell, "
Marriott, Thomas	VI	" "
Martin, John C. Jr.	IIa	" "
Martin, Willard E.	III	Somerville, "
Mason, John H.	VI	Lowell, "
Mason, Lester O.	VI	" "
Maxey, Leo M.	VI	" "
McCann, Peter J.	V	" "
McCarthy, John P.	II	" "
McCluskey, Dennis J.	II	No. Chelmsford, "
McCormick, Alfred J.	V	Lowell, "
McDermott, Arthur F.	V	" "
McDermott, Joseph F.	VI	" "
McDermott, Thomas P.	V	" "
McDonald, Charles	V	" "
McDonald, James H.	II	No. Chelmsford, "
McDonald, John J.	V	Lowell, "
McDonnell, Thomas F.	III	Lawrence, "
McEvoy, William A.	III	" "
McGrath, Christopher	V	Lowell, "
McHale, James F.	I	" "
McKercher, Frank	VI	" "
McLaughlin, Peter J.	I	" "
McMorrow, Michael	V	Lawrence, "

Name	Course	Address
McNamara, James F.	V	Lowell, Mass.
McNaughton, Stephen	III	" "
McParland, Joseph	VI	" "
McQuade, Hugh B.	V	" "
McQuarrie, Charles	V	" "
McQuarrie, William	V	" "
McTeague, Joseph B.	V	No. Chelmsford, "
McTeague, Thomas	II	No. Chelmsford, "
Meehan, John B.	VI	Lawrence, "
Merrill, Edwin C.	IV	" "
Metcalf, Benj. A.	IV	" "
Milot, Henry	I	Lowell, "
Milot, Alfred	VI	" "
Mirault, Ferdinand	I	" "
Mitchell, Charles A.	VI	" "
Mochrie, William	VI	" "
Molloy, George	VI	Lawrence, "
Moloney, Joseph F.	VI	Lowell, "
Monette, Edward J.	VI	" "
Montgomery, J. Leroy	III	" "
Moody, George H.	VI	" "
Mooney, William J.	V	" "
Moore, Charles L.	IV	" "
Moore, Rodney G. F.	V	" "
Moran, Christopher	V	" "
Morning, James	V	No. Chelmsford, "
Morris, Grover C.	II	Lowell, "
Morrisette, Jean B.	V	Lowell, Mass.
Moss, Louis G.	II	" "
Muldoon, Francis A.	VI	" "
Mullin, Anthony J.	V	" "
Murphy, Dennis F.	II	" "
Murphy, Edward A.	VI	" "
Murray, James J.	VI	" "
Neaves, Allen Z.	II	" "
Needham, Sumner H.	III	" "
Nelson, Gustave A.	VI	" "
Normandin, Alexander	VI	" "
Norton, George H.	IV	Lawrence, "
Notman, Frederick W.	V	Jamaica Plain, "
Nutall, James I.	I	Lowell, "
O'Boyle, Michael	VI	" "
O'Brien, Michael F.	VI	" "
O'Laughlin, Thomas A.	VI	" "
Oliver, Walter S.	VI	Methuen, "
Olsson, Gustaf F.	III	Lowell, "
O'Neil, John H.	VI	" "
O'Rourke, John J.	III	" "
O'Rourke, Timothy	V	" "
Osborne, Carl	V	" "

Name	Course	Address
Overend, John	V	Lawrence, Mass.
Peabody, Norman E.	VI	Lowell, "
Pearson, Paul E.	VI	" "
Perkins, John M. Jr.	I	" "
Perrin, Alfred	V	" "
Perron, Francis J.	V	Lawrence, "
Perry, Joseph A.	III	Lowell, "
Pevey, John F.	II	" "
Pickard, John A.	II	" "
Pigeon, Joseph	I	" "
Pigeon, Joseph L.	I	" "
Pihl, Christian E.	VI	" "
Pihl, Victor E.	VI	" "
Pittendreigh, John M.	I	" "
Pope, George X.	II	No. Chelmsford, "
Popplewell, Wilfred L.	II	Lowell, "
Porter, George K.	III	Dorchester, "
Pratt, Leo W.	VI	Lowell, "
Prior, Everett L.	II	" "
Quinlan, William H.	VI	" "
Quinn, John J.	V	" "
Rankin, Austin W.	V	" "
Rapson, Robert	II	" "
Reardon, Timothy H.	VI	" "
Redman, H. Stewart	V	" "
Reid, James S.	I	" "
Reynolds, Eugene	VI	" "
Reynolds, John	III	" "
Richardson, Ralph H.	III	" "
Riley, Charles E.	V	" "
Roberge, Joseph A.	I	" "
Robinson, Chester B.	IV	" "
Rourke, Austin F.	II	" "
Rourke, Daniel	I	" "
Rourke, William F.	IV	" "
Royce, Fred	VI	Lawrence, "
Rushworth, Walter	VI	Lowell, "
Russell, Ernest	V	" "
Rutyna, Barney	VI	" "
Ryan, William A.	VI	" "
Sabre, Peter W.	VI	" "
Sanders, Richard S.	VI	" "
Sargent, George	VI	" "
Sarre, Jean B.	VI	" "
Savoy, Peter	VI	" "
Schaufus, Emil C.	VI	Lawrence, "
Schofield, Hilton	V	Lowell, "
Schoon, Fenton	VI	Lawrence, "
Scott, Gilbert H.	VI	" "
Scott, James W.	I	Lowell, "



Name	Course	Address
Schubert, George J.	V	Lawrence, Mass
Senechal, George	V	" "
Shackleton, John H.	IV	" "
Shanley, John F.	VI	Lowell, "
Sharkey, Francis	VI	" "
Sharpe, John R.	V & VI	" "
Shaw, R. William	II	" "
Shaw, Richard M.	I	" "
Shea, William F.	II	" "
Sheerin, Mary F.	V	" "
Sheppard, Byron H.	VI	Lawrence, "
Sheppard, Ralph L.	VI	Lowell, "
Sherburne, Victor R.	IV	" "
Shore, William T.	I	" "
Silcox, Arthur	VI	" "
Simola, Emil J.	II (a & b)	" "
Smith, Harry E.	IV	" "
Smith, John C.	II	Lawrence, "
Somers, Charles G.	I	Lowell, "
Somers, George C.	II	Lawrence, "
Souther, Channing W.	II	No. Chelmsford, "
Spurr, James H.	IV	Lawrence, "
Stearns, Wilbur A.	III	Lowell, "
Stevens, George K.	II	Lawrence, "
Stewart, George	IV	" "
Stoehrer, Robert F.	VI	Andover, "
Stowell, Matthew J.	VI	Lowell, "
St. Pierre, Dieudonne,	VI	Lawrence, "
Sturtevant, Lester S.	VI	Methuen, "
Sullivan, Daniel	V	Lowell, "
Sullivan, John J.	VI	" "
Sullivan, Patrick J.	V	" "
Sunbury, Alice	IV	" "
Swanson, Alex V.	V	" "
Swindells, William S.	VI	Lawrence, "
Teague, George W.	I	Lowell, "
Thibault, Wilfred	V	Lawrence, "
Thornton, Charles	VI	Lowell, "
Tighe, Michael H.	II	" "
Tomlinson, John T.	II	Lawrence, "
Towle, Richard	I	Lowell, "
Toy, Christopher	III	" "
Toy, Samuel	VI	" "
Trainor, Edward J.	V	" "
Tremblay, Laurier	I	" "
Tuegeon, Fremont N.	I	" "
Vaughn, Edward A.	VI	" "
Verville, Ernest	I	" "
Verville, Homer J.	VI	" "
Vigneault, Rudolphe J.	VI	" "

Name	Course	Address
Wadsworth, Alex H.	III	Lawrence, Mass.
Wagg, Lewis E.	I	Lowell, "
Walker, George L.	VI	" "
Walker, Herbert T.	VI	" "
Walker, Robert	I	" "
Walmsley, William E.	III	" "
Washburn, George F.	IV	" "
Waterworth, Jasper	VI	Methuen, "
Waterworth, Nathan	V	Lowell, "
Watnough, James T.	II	Lawrence, "
Watson, Robert	I	Lowell, "
Watson, William A.	III	Lawrence, "
Watts, John S.	II	Lowell, "
Webb, Francis H.	III	" "
Webber, John F.	III	Roxbury, "
Weeks, Charles L.	VI	Lowell, "
Welch, Benj. L.	VI	" "
Wells, Edwin C.	VI	" "
Wenzel, August	II	Lawrence, "
Whitcomb, Harry E.	I	No. Andover, "
Whitcomb, Irving	I	Lowell, "
Whitehead, Harnold	II	No. Chelmsford, "
Whitten, Rollo	I	Lowell, "
Whitten, Willie W.	VI	" "
Whitworth, Albert	III	" "
Wholey, William P.	I	" "
Wilde, Thomas E.	IIa	" "
Wilder, Ralph S.	V	No. Billerica, "
Williams, Clarence	I	Lowell, "
Wolger, John J.	III	Methuen, "
Wolf, William C.	IV	Lawrence, "
Wright, William C.	VI	Lowell, "
Wylie, John C.	III	" "
Yarnold, Percy A.	VI	" "

## SUMMARY

Day Students . . . . .	142
Evening Students . . . . .	612
Total . . . . .	754
Names counted twice . . . . .	38
	716

## Alphabetical List of Graduates

Name	Course	Class	Day or Even'g.
Abbott, Edward M.	II	1904	D
Adams, W. R.	IIa	1902	E
Adams, M. E.	VI	1904	E
Aspinwall, Wm.	II	1901	E
Bailey, J. W.	I	1899	D
Baldwin, A. L.	IV	1900	D
Baldwin, F. A.	II	1904	D
Balmforth, J. H.	IIa	1903	E
“ “ “	IIb	1904	E
Balmforth, Wm. F.	VI	1904	E
Balmforth, Martha B.	III	1903	E
Barker, John H.	V	1904	E
Barlow, R.	V	1902	E
Barr, I. W.	I	1900	D
Barrington, John	IV	1904	E
Barry, E. J.	III	1903	E
Bastow, Henry	III	1903	E
Baxter, A. J.	IIa	1903	E
Bennett, E. H.	V	1903	D
* Berry, F. M.	V	1901	E
Binns, Heaton	II	1899	E
“ “	V	1899	E
“ “	VI	1902	E
Bloom, W. N.	IV	1904	D
Bodwell, H. A.	II	1900	D
Boucher, John L.	VI	1904	E
Bowring, G. P.	VI	1902	E
Bradley, Richard	V	1901	D
Brainerd, Irving L.	I	1902	E
Brickett, C. J.	II	1900	D
Broadbent, James T.	I	1899	E
Brooks, Noah	III & V	1901	E
Buchan, D. C.	II	1901	D
Burghardt, P. C.	II	1901	E
“ “	IIa	1902	E
Burnham, F. E.	IV	1902	D
Burkhard, E.	IIa	1902	E
Burrage, Katherine	III	1899	D
“ “	III P. G.	1900	D
Butler, Benj. O.	VI	1904	E
Buzzell, Wm. O.	III	1901	E
“ “	III P. G.	1902	E

\* Deceased

Name	Course	Class	Day or Even'g.
Byam, W. S.	VI	1903	E
Cady, D. J.	V	1903	E
Callahan, Patrick A.	VI	1904	E
Campbell, A. D.	II	1900	E
Campbell, Laura E.	III	1900	D
Campbell, Louise P.	III	1903	D
Campbell, Orison S.	II	1903	D
Carter, Robert A.	IV	1902	D
Cawthra, A. C.	II	1900	E
Chamberlin, Frederick E.	I	1903	D
Cheetham, J. J.	III	1901	E
" "	III P. G.	1902	E
" "	I	1904	E
Chippendale, E. W.	IIIb	1901	E
Clapp, F. A.	II	1904	D
Clogston, R. B.	IV	1904	D
Colby, A. D.	I	1900	E
Collier, John	III	1899	E
" "	III P. G.	1902	E
Conley, Fred'k A.	VI	1904	E
Connors, Edward F.	VI	1904	E
Cowdell, Herbert	V	1901	E
Cowdrey, C. E.	V	1902	E
Craig, C. E.	III	1902	D
Cremin, D. J.	I	1902	E
Crompton, H. H.	II	1899	E
Culver, R. F.	IV	1904	D
Curran, C. E.	III	1902	D
Currier, John A.	II	1901	D
Cutler, B. W. Jr.	III	1904	D
Cuttle, J. H.	II	1899	D
Davis, Henry	IIIb	1901	E
Davis, Prentice T.	I	1904	E
Delmage, Edward	III	1904	E
Dempsey, J. Wm.	IIa	1904	E
Dewey, J. F.	II	1904	D
Donahue, Michael F.	VI	1904	E
Donald, A. E.	II	1904	D
Donovan, D. F.	II	1901	E
Donnellan, Frank T.	IIa	1902	E
" "	V	1903	E
Donnelly, J.	I	1900	E
Doole, George L.	VI	1904	E
Dooley, Edward Wm.	VI	1904	E
Dudley, George E.	I	1902	E
Duggan, Francis P.	VI	1904	E
Elston, F. R.	III	1900	E
Emerson, Frank W.	II	1903	D
Evans, Alfred W.	III	1903	D
Evans, Wm. R.	III	1903	D

Name	Course	Class	Day or Even'g.
Evison, Wm. A.	V	1901	E
Ewer, N. T.	IV	1901	D
Farrell, Thomas	II	1901	E
Fels, A. B.	II	1899	D
Ferguson, A. F.	I	1902	D
“ “	I	1903	D
Ferguson, T.	V	1902	E
Field, C. W.	VI	1902	E
Flynn, J. J.	VI	1903	E
Forest, F. C.	IIa	1902	E
Fortune, D. A.	IIb	1902	E
Foster, C. E.	II	1901	D
Frame, Wm.	V	1901	E
Frank, Emil M.	III	1904	E
Fuller, George	I	1903	D
Gagan, J. H.	V	1901	E
Garner, Wm.	III	1903	E
Gaunt, Alfred C.	IIa	1899	E
“ “	III	1899	E
“ “	III P. G.	1902	E
“ “	IIa	1903	E
“ “	V	1904	E
Gerrish, Walter	III	1903	D
Good, Henry	I	1902	E
Goodchild, George	I	1903	E
Goodhue, Amy H.	IIIb	1900	D
(See Harrison)	IIIb P. G.	1901	D
Grant, Archibald	IIb	1901	E
Gray, F. M.	VI	1903	E
Grouke, Michael	IIb	1901	E
Haigh, W.	III	1902	E
Halsell, E. R.	I	1904	D
Harmon, C. F.	I	1899	D
Harriman, H. I.	V	1899	D
Harris, George S.	I	1902	D
Haskell, Walter F.	IV	1902	D
Hastings, Walter L.	I	1899	D
Haworth, J.	VI	1902	E
Hempel, Frank	V	1904	E
Higgins, J. A.	IIa	1903	E
“ “	IIb	1904	E
Hill, Daniel	IIb	1901	E
Hitchcock, T. B.	I-II-III	1901	E
Hogan, J.	V	1902	E
Holgate, C. H.	II	1901	E
Holgate, Benj.	III	1902	D
“ “	V	1903	D
Horsfall, George C.	II	1904	D
Howard, J.	V	1900	E
“ “	III	1903	E

Name	Course	Class	Day or Even'g
Hoyle, Joseph	IIb	1904	E
Hoyle, E.	IIb	1902	E
Hunter, Ralph	III	1901	E
“ “	V	1903	E
Hutton, Clarence	V	1900	E
“ “	III	1903	D
Jeanotte, Arthur	VI	1904	E
Jennings, J. J.	III	1903	E
Johnson, E. A.	II	1902	E
Johnson, S. L.	V	1903	E
Jones, E. A.	II	1904	D
Jones, W. J.	II	1900	E
	II	1901	E
Jury, Alfred E.	IV	1904	D
Keleher, J. J.	IIb	1903	E
Kellet, Irvine	II	1899	E
Kelley, M. H.	I	1902	E
Kent, E. J.	IIb	1902	E
Kershaw, Wm. H.	V	1904	E
Killerby, Walter	IIb	1901	E
Kingsbury, P. F.	IV	1901	D
Knowles, F. E.	I	1903	E
Lakeman, Fannie S.	III	1900	D
Lamont, W. A.	IIb	1902	E
Lamson, George F.	I	1900	D
Langevin, Felix D.	VI	1904	E
Law, Alfred	IIb	1901	E
Lawless, A. J.	V	1902	E
Lawrence, Charles	I	1903	E
Leach, John P.	I & V	1900	D
Leach, J. W.	V	1903	E
Lee, Charles	I	1902	E
Leith, E. E.	III	1902	E
Libby, C. R.	VI	1902	E
Lincourt, H. L.	VI	1903	E
Lord, Harry D.	III	1904	E
Lord, Wilfred	III	1901	E
“ “	IIb	1903	E
“ “	IIa	1904	E
Lucey, Edmund A.	II	1904	D
Mackay, R. N.	I	1899	D
MacPherson, W. A.	III	1904	D
Maden, H.	II	1900	E
Margerison, I. D.	II	1899	E
Marinel, Walter N.	I	1901	D
Mason, F. A.	I	1903	E
Mortenson, C. W.	III	1903	E
McAllister, J. W.	V	1899	E
McBride, Robert G.	IIa	1904	E
McQuade, H. B.	V	1901	E



Name	Course	Class	Day or Even'g.
Merchant, Edith C.	IIIb	1900	D
Meadows, Wm. R.	I	1904	D
Merrill, Edwin C.	VI	1904	E
Miller, Emil H.	V	1904	E
Minge, Jackson C.	I	1901	D
" "	I-III-V	1901	E
Moir, A. L.	III	1899	E
" "	III P. G.	1903	E
Molloy, A.	V	1902	E
Moorhouse, W. R.	IV	1901	D
Moorhouse, Thomas	VI	1904	E
Morris, Frank	V	1901	E
Morrison, Fred C.	I	1903	D
Mozley, A.	VI	1903	E
Murphy, John H.	VI	1904	E
Myers, J. W.	III-IV	1903	E
Najarian, G.	IV	1903	D
Nelson, Ernest	IIa	1900	E
" "	IIb	1901	E
Nicholson, Richard	IIb	1903	E
Noble, John T.	V	1899	E
" "	III	1901	E
Noonan, D. T.	III	1903	E
Notman, Frederick W.	I	1904	E
Nugent, T. A.	II-V	1899	E
" "	VI	1902	E
O'Donnell, J. D.	I	1904	D
Ogley, Samuel A.	II	1900	E
O'Hara, Wm. F.	IV	1904	D
Osgood, C. F.	II	1900	E
" "	VI	1902	E
Palmer, G. B.	III	1903	E
Parker, B. Moore	I	1901	D
Parker, E. N.	I	1904	D
Parker, Harry C.	V	1903	D
Patrick, Alexander	III	1904	E
Peel, Hudson	IIb	1901	E
Petty, George E.	I-V	1903	D
Perkins, John E.	III	1900	D
Potter, R. W.	V	1902	E
Pradel, A. J.	III	1900	D
Ramsdell, T. Ellis	I	1902	D
* Rasche, Wm. A.	III	1903	D
Redman, Henry S.	III	1904	E
Reed, F. C. K.	VI	1904	E
Reynolds, H. L.	III	1901	E
Reynolds, Isabel H.	IIIb	1903	D
Rhodes, Joseph E.	V	1904	E
Robinson, Wm. C.	III-V	1903	D

\* Deceased.

Name	Course	Class	Day or Even'g.
Rockwell, H. D.	IIa	1903	E
Rockwell, Samuel	IIa	1902	E
Rooney, George W.	I	1904	E
Rosenthal, John S. (Wilson)	II	1903	D
Rowell, H. C.	I-II	1900	E
Saunders, E. B.	III	1901	E
Scanlon, E. J.	II	1901	E
Schermerhorn, Geo. E.	I	1902	E
Schofield, J. S.	III	1903	E
Schoon, Fenton	IIb	1903	E
Shannon, Philip	V	1901	E
Shaw, James	V	1904	E
Silcox, A. E.	I	1900	E
Sleeper, Robert R.	IV	1900	D
Smith, A. A.	I	1899	D
Smith, Fred	IIb	1901	E
Smith, W. H.	IIb	1902	E
Smith, Stephen E.	I	1900	D
Smith, R. F.	I	1904	D
Smith, John W.	IIb	1904	E
Smith, Edward	I	1904	E
Snelling, Fred N.	II	1903	D
Snow, F. L.	IV	1900	E
Spedding, E. H.	III	1899	E
Spiegel, Edward	V	1903	D
Sterling, Walter	III	1904	E
Stevens, Dexter	I	1904	D
Stevenson, Murray R.	III-V	1903	D
Stevenson, Wm.	II	1899	E
"    "	III	1902	E
Sterwart, A. A.	II	1900	D
Stewart, Walter L.	III	1903	D
Stokham, Burton I.	IV	1903	E
"    "	IV P. G.	1904	E
Stopherd, W. H.	II-V	1899	E
	VI	1902	E
Swift, Edwin S.	V	1899	E
"    "	I	1901	E
"    "	III	1902	D
Syme, James F.	II	1900	D
Tarpey, John F.	IIa	1904	E
Thompson, H. J.	IV	1900	D
Thompson, Charles B.	VI	1904	E
Tilton, E. T.	II	1899	D
Tonge, Matthew	III	1903	E
Toovey, S. E.	II	1904	D
Umpleby, T. B.	V	1902	E
Upton, F. A.	I	1903	E
Varney, M. H.	III	1902	E
"    "	I	1903	E

Name	Course	Class	Day or Even'g.
Vogt, A. H.	III	1902	E
Walker, Anna G.	IIIb	1903	D
Walker, David	III	1902	E
“ “	III P. G.	1903	E
Wardrobe, W. L.	I	1900	E
Waterhouse, J.	IV	1900	E
Webb, F. H.	IV	1904	D
“ “	V	1904	E
Webber, A. H.	IV	1901	D
Wesson, Paul B.	I	1901	E
White, R. P.	II	1904	D
Whitehead, Bennett	IIb	1901	E
Wiley, Frank S.	I	1901	E
Williamston, I. F.	IV	1901	E
Wilmot, Wm.	III	1899	E
Wilson, W. E. H.	I	1904	D
Wilson, C. E.	IIb	1902	E
Wilson, G. H.	IIb	1902	E
Wilton, G. H.	III	1899	E
Wing, C. T.	III	1900	E
“ “	III	1902	D
Wise, Paul T.	II	1901	D
Wood, Jno.	I	1902	E
Woodbury, W. S.	I	1900	E
Woodies, Ida A.	IIIb	1900	D
“ “	IIIb P. G.	1901	D
Woodman, Harry L.	I	1902	D

## CLASS OF 1905

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### Graduates with Titles of Thesis

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#### Day Classes.

Diplomas were awarded as follows:

- Henry Shaw Adams, Cotton Manufacturing, Haverhill, Mass.  
"Relation of Twist to Contraction and Strength of Cotton Yarn."
- George Andrew Boyd, Cotton Manufacturing, Oakdale Mass.  
Thesis with C. E. Harris.  
"A Comparison of Methods of Preparing Cotton for Combing."
- George Everett Carr, Cotton Manufacturing, Adams, Mass.  
"Influence of Filling Twist upon Shrinkage of Cotton Cloth."
- James Thomas Cole, Wool Manufacturing, Medford, Mass.  
Thesis with H. B. Arundale.  
"Effect of Pitch of Screw of Scaife Motion on Size and Shape of Filling Bobbin."
- James Henry Dillon, Designing, Belchertown, Mass.  
"The Arrangement of Jacquard Design."
- Charles Edward Harris, Cotton Manufacturing, Easthampton, Mass.  
Thesis with G. A. Boyd.
- James Louis Hollings, Cotton Manufacturing, Dorchester, Mass.  
"Power Measurements upon a Whitin Loom."
- Russell Weeks Hook, Chemistry and Dyeing, West Medford, Mass.  
"A Study of Raw Wool Fibre with Special Reference to its Chemical Nature and Composition."
- Everett Amos Jones, Designing, Lowell, Mass.  
Thesis 1903-1904.
- Walter Scott Lewis, Chemistry and Dyeing, Woburn, Mass.  
"Logwood in Wool Dyeing."
- Hugh Francis McKenna, Chemistry and Dyeing, Woburn, Mass.  
Thesis with A. J. Midwood.  
"A System of Testing the Properties of Coloring Matters as Regards Fastness to Light."
- Arnold Joseph Midwood, Chemistry and Dyeing, Lowell, Mass.  
Thesis with H. F. McKenna.

- Everett Byron Moore, Cotton Manufacturing, Lynn, Mass.  
 "The Effect of Doubling upon the Evenness and Strength."
- Everett Nichols Parker, Cotton Manufacturing, Lowell, Mass.  
 Thesis 1903-1904.
- Everett Leander Thompson, Cotton Manufacturing, No. Woburn, Mass.  
 "A Comparison of the Strength of Single and  
 Ply Yarns."
- Philip Hamilton Warren, Wool Manufacturing, Worcester, Mass.  
 "A Study of the Position of the Fibres during  
 Carding."
- Stanley Herbert Wheelock, Wool Manufacturing, Uxbridge, Mass.  
 "Influence of Burr Picking on Short and  
 Medium Wools."
- Certificates for Partial Courses were awarded as follows:**
- Henry Barnes Arundale, Woolen and Worsted Spinning, Lawrence, Mass  
 Designing and Weaving.  
 Thesis with J. T. Cole.
- Jennie Grace Conklin, Decorative Art, Lowell, Mass.  
 "A Design for a Rug."
- William Leavitt Curtis, Woolen and Worsted Spinning, Roxbury, Mass.  
 Thesis with W. H. Lee.  
 "Comparison of Cap Flyer and Ring Spun Worsted Yarn."
- Chester Lansing Hunt, Designing, Lowell, Mass.  
 "Color as Applied to Textiles."
- William Henry Lee, Weaving, Holyoke, Mass.  
 Thesis with W. L. Curtis.
- William John Marra, Designing and Weaving, Holyoke, Mass.  
 "Jacquard Lenos."
- John Francis Pevey, Designing, Lowell, Mass.  
 "Metric System as Applied to Textile Calculations."
- Pat Howell Roberson, Cotton Spinning, Lowell, Mass.  
 "Experiments in the Manufacture of Fancy Yarns."
- Carrie Isabel Roberts, Decorative Art, Lowell, Mass.  
 "A Design for Tapestry or Wall Paper."
- Roland Vincent Thomas, Cotton Spinning, Boston, Mass.  
 "A Comparison of the Strength of Dyed, Bleached and  
 Gray Cotton Yarns."
- Edward Wright, Jr., Woolen and Worsted Spinning, Lawrence, Mass.  
 "A Study of the Effect of Gilling in Worsted Combing."

# EVENING CLASS OF 1905.

Certificates awarded as follows: May 18, 1905.

## Course I—3 Years.

(Cotton Spinning.)

Thomas Francis Burke,	Lowell, Mass.
Cleophas Caron,	Lawrence, "
Earle Byron Gay,	Lowell, "
Sherwood Lloyd Foster,	" "
Ernest Jerome French,	Lawrence, "
Joseph Kenworthy,	Lowell, "

## Course IIa—1 Year.

(Woolen Spinning.)

Frederick William Bell,	Lowell, Mass.
Thomas Egbert Wilde,	" "

## Course II (a and b)—3 Years.

(Woolen and Worsted Spinning.)

John Aloysius Collins,	Brighton, Mass.
John Cornelius Martin, Jr.	Lowell, "
Emil Johannes Simola,	" "

## Course III—3 Years.

(Designing.)

Herbert Bake,	Andover, Mass.
James Plunkett Brown,	Lowell, "
Hugo Paul Dick,	Lawrence, "
Benjamin Charles Dimlick,	" "
George W. Haven,	Melrose Highlands, "
Andrew Molloy,	Lowell, "
Clarence W. Skinner,	Methuen, "
Arthur Smith,	Lawrence, "
George Arnold Smith,	Methuen, "
William Edward Smith,	" "
William Herbert Stopherd,	Lowell, "

## Course IV—4 Years.

(Chemistry and Dyeing.)

Lewis Granville Hunton,	Lowell, Mass.
Peter Francis O'Neill,	Lawrence, "
Frederick C. M. Silk,	Lowell, "
John Tonge,	Lawrence, "



# 4 Years.

(Chemistry.)

Edward J. Burns,	Lowell, Mass.
James E. Burns,	" "

# Course V—2 Years.

(Weaving.)

Henry Bastow,	Lawrence, Mass.
James John Eugene Custer,	Lowell, "
Thomas Howard,	" "
Hugh McManus,	" "
John Overend,	Lawrence, "
Henry Stewart Redman,	Lowell, "
Frank Trowbridge Wiswall,	Lawrence, "

# Course VI—2 Years.

(Mechanical Engineering.)

Samuel Albert Bowie,	Lawrence, Mass.
Ernest L. Bryant,	Lowell, "
Clarence A. Dana,	" "
Gustave Erbe,	Lawrence, "
George Goodchild,	Lowell, "
Elmer Elroy Harder,	" "
Herbert Raymond Hunt,	" "
Irving Dunning Kimball,	" "
George F. Lamson,	" "
Alfred Clarke Linkletter,	" "
Charles Edgar Lovell,	" "
James H. Maguire,	" "
Frank Wilbur Stevens,	" "

## List of Past Students

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- (C) Indicates Certificate, Partial Course.  
 (D) Indicates Diploma, Complete Course.  
 (P.G.) Indicates Post Graduate Course.  
 (||) Indicates Last Known Address.  
 (\*) Deceased.

### Day Course, 1899.

Name	Course	Occupation.
Bailey, J. W.	I D	Principal, Bradford-Durfee Textile School, Fall River, Mass.
Burrage, Katherine	IIIb C	Teacher, Evening Drawing School, Lowell, Mass.
Cuttle, J. H.	II D	Designer, Arlington Mills, Lawrence, Mass.
Fels, A. B.	II D	Sec. to Gen. Mgr. Mass. Electric Co., Boston, Mass.
Harriman, H. I.	V	Agent American Loom Co., Readville, Mass.
Hastings, Walter L.	I	Asst. Agent Arlington Mills, Lawrence, Mass.
Harmon, C. F.	I D	In business, Lowell, Mass.
Mackay, R. N.	I	Selling Agent American Loom Co., Readville, Mass.
Smith, A. A.	I D	Lowell, Mass.
Tilton, E. T.	II D	Electrician, American Trackless Trolley Co., Boston, Mass.

### Evening Course, 1899.

Name	Course	Occupation.
* Berry, F. M.	III C	
Binns, Heaton	II & V C	Overseer, Bigelow Carpet Co., Lowell, Mass.
Broadbent, J. T.	I C	Instructor Carding and Spinning, Bradford-Durfee Textile School, Fall River, Mass.
Collier, John	II C	Superintendent, Knoxville Woolen Mills, Knoxville, Tenn.
Crompton, H. H.	II C	Second Hand, French Drawing, Arlington Mills, Lawrence, Mass.
Gaunt, A. C.	III C	Supt. and Designer, Tremont Worsted Co., Methuen, Mass.
Kellett, Irvine	II C	Second Hand Worsted Spinning, Lower Pacific Mills, Lawrence, Mass.

Name	Course	Occupation.
McAllister, J. W.	V C	Salesman, H. A. Metz & Co., New York.
Moir, A. L.	III C	Letter Carrier, Lowell, Mass.
Noble, J. T.	V C	Bookkeeper, Walsh Mills, Lowell, Mass.
Nugent, T. A.	II & V C	Second Hand, Bigelow Carpet Co., Lowell, Mass.
Spedding, E. H.	III C	Second Hand, Weave room, Tremont & Suffolk Mills, Lowell, Mass.
Stevenson, Wm.	II C	Supt. Franklin Woolen Mills, Franklin, Ky.
Stopherd, W. H.	II & V C	Overseer Bigelow Carpet Co., Lowell, Mass.
Swift, E. S.	V C	Cotton Yarn Salesman, Catlin & Co., Boston, Mass.
Wilmot, Wm.	III C	Designer Hamilton Web. Co., Hamilton, R. I.
Wilton, G. H.	III C	Overseer Designing, M. T. Stevens & Sons Co., No. Andover, Mass.

#### Day Course, 1900.

Name	Course	Occupation.
Baldwin, A. L.	IV D	Chicago, Ill.
Barr, I. W.	I D	Designer, Lawrence & Co., New York City.
Bodwell, H. A.	II D	Asst. Supt. Linen Thread Mill, Smith & Dove, Andover, Mass.
Brickett, C. J.	II D	Asst. Prin. International Correspondence School, New Bedford, Mass.
Burrage, Katherine, P. G.	IIIb C	See Day Course, 1899.
Campbell, Laura E.	IIb C	Designer, Lowell, Mass.
Harrison, Mrs. Amy H. (Goodhue)	IIIb C	Dracut, Mass.
Lakeman, Fannie S.	IIIb C	Designer, Salem, Mass.
Lamson, G. F.	I D	Draftsman, Merrimack Mfg. Co., Lowell, Mass.
Leach, J. P.	I & V C	Foreman Carding Dept., Harriet Cotton Mills, Henderson, N. C.
Merchant, Edith C.	IIIb C	Designer, Lowell, Mass.
Parker, H. C.	V C	Enfield, N. H.
Perkins, John E.	III D	Asst. Supt. and Designer S. W. & C. Russell Woolen Mills, Pittsfield, Mass.
Pradel, A. J.	III D	Designer, Lowell, Mass.
Sleeper, Robert R.	IV D	With H. A. Metz & Co., New York City.

Name	Course	Occupation.
Smith, S. E.	I D	Head Instructor Cotton Spinning, Lowell Textile School, Lowell, Mass.
Stewart, A. A.	II D	Instructor in Finishing, Lowell Textile School, Lowell, Mass.
Syme, J. F.	II D	Agent Ray Mills, (American Woolen Co.,) Franklin, Mass.
Thompson, H. J.	IV D	Dyer, Boston Rubber Shoe Co., Malden, Mass.
Woodies, Ida A.	IIIb C	Asst. Instructor, Art Dept., Lowell Textile School, Lowell, Mass.

### Evening Course, 1900.

Name	Course	Occupation.
Campbell, A. D.	IIb C	Section Hand, Arlington Mills, Lawrence, Mass.
Cawthra, A. B.	IIb C	Overseer, Worsted Spinning, U. S. Bunting Co., Lowell, Mass.
Colby, A. D.	I C	Foreman, Card Dept., Lowell Ma- chine Shop, Lowell, Mass.
Donnelly, J.	I C	Second Hand Mule Room, Stark Mill, No. 6, Manchester, N. H.
Elston, F. R.	III C	Head Designer, Fitchburg Mills, Fitchburg, Mass.
Howard, J.	V C	Overseer of Weaving, Belvidere Woolen Mill, No. 2, Lowell, Mass.
Hutton, Clarence	V C	Director Textile Dept., Am. School of Correspondence, Chicago, Ill.
Jones, W. J.	IIb C	Overseer, Worsted Spinning, U. S. Bunting Co., Lowell, Mass.
Maden, H.	IIb C	Section Hand, U. S. Bunting Co., Lowell, Mass.
Nelson, Ernest	IIb C	Pattern Weaver, Mass. Cotton Mills, Lowell, Mass.
Ogley, S. A.	IIb C	Overseer Worsted Spinning, Moore Spinning Co., No. Chelmsford, Mass.
Osgood, C. F.	I C	Draftsman, Lamson C. S. S. Co., Lowell, Mass.
* Rowell, H. C.	I & IIb C	
Silcox, A. E.	I C	Slasher and Warp Dept., L. M. S., Lowell, Mass.
Snow, F. L.	IV C	Overseer Dyeing and Bleaching, Lawrence Mfg. Co., Lowell, Mass.
Wardrobe, W. L.	I C	Lawrence, Mass.
Waterhouse, J.	IV C	Section Hand, Merrimack Print Works, Lowell, Mass.

Name	Course	Occupation.
Wing, C. T.	II C	Designer, Middlesex Co., Lowell, Mass.
Woodbury, W. S.	I C	Overseer Carding, Dana Warp Mills, Westbrook, Me.

#### Day Course, 1901.

Name	Course	Occupation.
Bradley, Richard	V C	Loom Fixer, Atlantic Mills, Providence, R. I.
Buchan, D. C.	II D	Overseer Weaving, Atlas Linen Co., Meredith, N. H.
Currier, John A.	II D	Asst. Supt. Haile & Frost Mfg. Co., Hinsdale, N. H.
Ewer, N. T.	IV D	Chemist, American Dyewood Co., Boston, Mass.
Foster, C. E.	II D	Second Hand Card Room, American Woolen Co., Winooski, Vt.
Harrison, Mrs. Amy H. Goodhue	P. G. IIIb C	Dracut, Mass.
Kingsbury, P. F.	IV D	Asst. Color Maker, Hamilton Print Works, Lowell, Mass.
Marinel, W. N.	I D	Mechanical Engineer, DeBona Bros. Marble Co., Quincy, Mass.
Minge, J. C.	I C	Sec.-Treas. Minge Mfg. Co., Demopolis, Ala.
Moorhouse, W. R.	IV D	Color Chemist, Cassella Color Co., Boston, Mass.
Parker, B. M.	I D	Inst. Carding and Spinning, Clemson College, N. C.
Pratt, A. S.	I	Agent Edwards Mfg. Co., Augusta, Me.
Webber, A. H.	IV D	Chemist, F. E. Atteaux Co., Boston, Mass.
Wise, P. T.	II D	Supt. Brookside Mills, West Chelmsford, Mass.
Woodies, Ida A.	P. G. IIIb C	See Day, 1900.

#### Evening Course, 1901.

Name	Course	Occupation.
Aspinwall, Wm.	IIb C	Overseer, Drawing, Southwark Mills, Philadelphia, Pa.
* Berry, F. M.	V C	
Brooks, Noah	III & V C	Lowell, Mass.
Burghardt, P. C.	IIa C	Second Hand, Card Room, Merri-mack Woolen Co., Lowell, Mass.

Name	Course	Occupation.
Buzzell, Wm. O.	III C	Loom-fixer, Dartmouth Mfg. Co., New Bedford, Mass.
Cheetham, John James	III C	Spinning Room, Massachusetts Mills, Lowell, Mass.
Chippendale, E. W.	IIb C	Section Hand, Combing, Moore Spinning Co., North Chelmsford, Mass.
Cowdell, Herbert	V C	Loom-fixer, Massachusetts Co., Lowell, Mass.
Davis, Henry	IIb C	Worsted Carder, Hudson Worsted Co., Hudson, Mass.
Donovan, D. F.	IIa C	Second Hand, Woolen Carding, Yonkers, N. Y.
Evison, Wm. A.	V C	Loom-fixer, Prescott Mills, Lowell, Mass.
Farrell, Thos.	IIa C	Woolen Spinner, Stirling Mills, Lowell, Mass.
Frame, Wm.	V C	Loomfixer, Lowell, Mass.
Gagan, J. H.	V C	Overseer, Stirling Mills, Lowell, Mass.
Grant, Archibald	IIb C	Section-hand, Spinning and Twist- ing, Bigelow Carpet Co., Lowell, Mass.
Groucke, Michael	IIb C	Section-hand, Brussels Dept., Bigelow Carpet Co., Lowell, Mass.
Hill, Daniel	IIb C	Overseer Worsted Spinning, Maine Alpaca Co., Springvale, Me.
Hitchcock, T. B.	I-II-III C	Publishing, Grafton Press, New York City.
Holgate, C. H.	IIa C	Salesman, Selmar Hess, New York.
Hunter, Ralph	III C	Salesman, Treat, Converse & Co., New York City.
Jones, W. J.	IIa C	Worsted Spinner, U. S. Bunting Co., Lowell, Mass.
Killerby, Walter	IIb C	Supt. Park Worsted Mills, Lowell, Mass.
Law, Alfred	IIb C	Section Hand, Arlington Mills, Lawrence, Mass.
Lord, Wilfred	III C	Asst. Designer, Lower Pacific Mills, Lawrence, Mass.
McQuade, H. B.	V C	Loom Fixer, Bigelow Carpet Co., Lowell, Mass.
Minge, J. C.	I-III-V C	Sec. and Treas. B. Minge Mfg. Co., Demopolis, Ala.
Morris, F. A.	V C	Loom Fixer, Belvidere Woolen Co., Lowell, Mass.
Nelson, Ernest	IIa C	Pattern Weaver, Mass. Cotton Mills, Lowell, Mass.
Noble, J. T.	III C	Bookkeeper, Walsh Mills, Lowell, Mass.



Name	Course	Occupation.
Peel, Hudson	Iib C	Section Hand, Arlington Mills, Lawrence, Mass.
Reynolds, H. L.	III C	Overseer, Merrimack Mfg. Co., Lowell, Mass.
Saunders, E. B.	III C	Second Hand, Weave Room, Fall River Iron Works, Fall River, Mass.
Scanlon, E. J.	Iib C	Coal and Wood Dealer, Lawrence, Mass.
Shannon, P. J.	V C	Loom Fixer, Belvidere Woolen Co., Lowell, Mass.
Smith, Fred	Iib C	Overseer, Washington Mills, Lawrence, Mass.
Swift, E. S.	I C	See Evening, 1899.
Wesson, P. B.	I C	Foreman, Lowell Machine Shop, Lowell, Mass.
Whitehead, Bennett	Iib C	Second Hand, Worsted Spinning; Arlington Mills, Lawrence, Mass.
Wiley, Frank S.	I C	Second Hand, Carding, Lawrence, Mass.
Williamson, I. F.	IV C	Asst. Dyer, Hamilton Mfg. Co., Lowell, Mass.

#### Day Course, 1902.

Name	Course	Occupation.
Burnham, F. E.	IV D	Chemist, Passaic Print Works, Passaic, N. J.
Carter, Robert A.	IV D	Supt. Bleaching Station, Roessler & Hasslacher Chemical Co., Perth Amboy, N. J.
Craig, C. E.	III D	Purchasing Agent, Meriden Dairy Co., Kansas City, Mo.
Curran, C. E.	II C	Asst. Designer, Washington Mills, Lawrence, Mass.
Ferguson, A. F.	I C	Instructor, Design Dept., Lowell Textile School, Lowell, Mass.
Harris, George S.	I C	Supt. Sycamore Mills, Sycamore, Ala.
Haskell, Walter F.	IV D	Overseer of Dyeing, Dana Warp Mills, Westbrook, Me.
Holgate, Benj.	III C	Store and Bookkeeper, Lowell Textile School, Lowell, Mass.
Ramsdell, T. E.	I D	Agent Monument Mills, Housa- tonic, Mass.
Swift, E. S.	III D	See Evening 1899, and 1901.
Wing, C. T.	III D	Designer, Middlesex Co., Lowell, Mass.
Woodman, H. L.	I C	Draftsman, Lowell Machine Shop, Lowell, Mass.

# Evening Course, 1902.

Name	Course	Occupation.
Adams, W. R.	Ila C	Pressman, Stevens Mills, No. Andover, Mass.
Barlow, R.	V C	Finishing Dept., Hamilton Mfg. Co., Lowell, Mass.
Binns, Heaton	VI C	See Evening 1899.
Bowring, G. P.	VI C	Machinist, Lowell Machine Shop, Lowell, Mass.
Brainerd, Irving L.	I C	Overseer Carding, W. L. Barrell & Co., Lawrence, Mass.
Burkhard, E.	Ila C	Lawrence, Mass.
Buzzell, Wm. O.	P. G. III C	See Evening 1901.
Cheetham, J. J.	P. G. III C	See Evening 1901.
Collier, J.	P. G. III C	See Evening 1901.
Cowdrey, C. E.	V C*	Pattern Weaver, Talbot Mills, No. Billerica, Mass.
Cremin, D. J.	I C	Second Hand, Boott Cotton Mill, Lowell, Mass.
Donnellan, F. T.	Ila C	Runner, Lowell Textile School, Lowell, Mass.
Dudley, G. E.	I C	Third Hand, Carding, Mass. Mills, Lowell, Mass.
Ferguson, T.	V C	Loom Fixer, Appleton Mills, Lowell, Mass.
Field, C. W.	VI C	Draftsman, C. F. Morrill. Somerville, Mass.
Forest, F. C.	Ila C	Finishing Room, Middlesex Co., Lowell, Mass.
Fortune, D. A.	Iib C	Section Hand, Worsted Spinning, Lower Pacific Mills, Lawrence, Mass.
Gaunt, A. C.	P. G. III C	See Evening 1899.
Good, Henry	I C	In business, Providence, R. I.
Haigh, W.	III C	U. S. Bunting Co., Lowell, Mass.
Haworth, J.	VI C	Machinist, Lowell, Mass.
Hogan, J.	V C	Lowell, Mass.
Hoyle, E.	Iib C	Asst. Supt. Moore Spinning Co., No. Chelmsford, Mass.
Johnson, E. A.	Iib C	Asst. Supt. Yarn Dept., Washington Mills, Lawrence, Mass.
Kelley, M. H.	I C	Second Hand, Card room, Appleton Co., Lowell, Mass.
Kent, E. J.	Iib C	Section Hand, Worsted Spinning, Lower Pacific Mills, Lawrence, Mass.
Lamont, W. A.	Iib C	Asst. Supt. Worsted Dept., Washington Mills, Lawrence, Mass.
Lawless, A. J.	V C	Overseer, Weaving, Belvidere Woolen Co., Lowell, Mass.

Name	Course	Occupation
Lee, Charles	I C	Lowell, Mass.
Leith, E. E.	III C	Asst. Supt. Thos. Kent Mfg. Co., Clifton Heights, Pa.
Libby, C. R.	VI C	Draftsman, Lamson S. S. Co., Lowell, Mass.
Molloy, Andrew	V C	Second Hand Balling and Warping, Tremont & Suffolk Mills, Lowell, Mass.
Nugent, T. A.	VI C	See Evening 1899.
Osgood, C. F.	VI C	See Evening 1900.
Potter, R. W.	V C	Loom Fixer, Mass. Mfg. Co., Lowell, Mass.
Rockwell, S. F.	Iia C	Machinist, Davis & Furber Machine Co., No. Andover, Mass.
Schermerhorn, George E.	I C	Overseer, Carding and Combing Chas. Chipman's Sons, Easton, Pa.
Smith, W. H.	Iib C	Section Hand, Worsted Spinning, Arlington Mills, Lawrence, Mass.
Stevenson, Wm.	III C	See Evening 1899.
Stopherd, W. H.	VI C	See Evening 1899.
Umpleby, T. B.	V C	Ontario, Canada.
Varney, M. H.	III C	Overseer Cloth Room, Amory Mfg. Co., Manchester, N. H.
Vogt, A. H.	III C	Designing room, George E. Kun- hart's Mill, Lawrence, Mass.
Walker, David	III C	Overseer, Burling & Sewing, Beaver Brook Mills, Collinsville, Mass.
Wilson, C. E.	Iib C	Third Hand, Twisting, Arlington Mills, Lawrence, Mass.
Wilson, G. H.	Iib C	Section Hand, Worsted Spinning, Lower Pacific Mills, Lawrence, Mass.
Wood, Jno.	I C	Overseer, Spinning, Chas. Chip- man's Sons, Easton, Pa.

#### Day Course, 1903.

Name	Course	Occupation.
Bennett, E. H.	V C	F. P. Bennett & Co., New York City.
Bloom, W. N.	IV D	Chemist, Berlin Aniline Co., New York City.
Campbell, O. S.	II D	With American Felt Co., Dolge- ville, N. Y.
Campbell, Louise P.	IIIb C	Designer, Lowell, Mass.
Chamberlin, Frederick E.	I D	With China, Webster and Pem- broke Mills, Suncook, N. H.

Name	Course	Occupation
Emerson, F. W.	II D	Instructor, Woolen and Worsted Yarn Dept. Lowell Textile School, Lowell, Mass.
Evans, Wm. R.	III D	Bradford, Mass.
Evans, A. W.	III D	Arlington Mills, Lawrence, Mass.
Ferguson, Arthur F.	I D	See Day Course 1902.
Fuller, George	I D	Designer, Eclipse Mills, Arnold Print Works, No. Adams, Mass.
Gerrish, Walter	III D	Malden, Mass.
Holgate, Benj.	V C	See Day 1902.
Hutton, Clarence	III C	See Evening 1900.
Morrison, Fred C.	I D	Clerk, L. W. Phelps, Ayer, Mass.
Najarian, Garabed	IV D	Dyer, Monument Mills, Housatonic, Mass.
Petty, George E.	I C	Shipping Clerk, Wiscasset Mill Co., Albemarle, N. C.
* Rasche, Wm. A.	III D	
Reynolds, Isabel H.	III C	Designer, No. Andover, Mass.
Robinson, Wm. C.	III C	Asst. Designer, Solway Mills, Westerly, R. I.
Rosenthal, John S.	II D	Designer, U. S. Bunting Co., Lowell, Mass.
Snelling, Fred N.	II D	Salesman, with J. B. McMurtry, Brooklyn, N. Y.
Spiegel, Edward	V C	Wool Sorting, U. S. Bunting Co., Lowell, Mass.
Stevenson, M. R.	III C	Designer, The Russell Mfg. Co., Middletown, Conn.
Stewart, W. L.	III D	Designer, Clarence Whitman & Co., New York City.
Walker, Anna G.	IIIb C	Teacher of Painting, Lowell, Mass.

#### Evening Course, 1903.

Name	Course	Occupation.
Balmforth, J. H.	Ila C	Spinner, East Rochester, N. H.
Balmforth, Martha B.	III C	Ins't. Hand Loom Dept., Lowell Textile School, Lowell, Mass.
Barry, E. J.	III C	Overseer, Pemberton Co., Lawrence, Mass.
Bastow, Henry	III-V C	Warp Dresser, Arlington Mills, Lawrence, Mass.
Baxter, A. J.	Ila C	Bookkeeper, Assabet Mills, Maynard, Mass.
Byam, W. S.	VI C	Machinist, Lowell Machine Shop, Lowell, Mass.
Cady, D. J.	V C	Section Hand, Weaving, Washington Mills, Lawrence, Mass.
Donnellan, F. T.	V C	See Evening, 1902.

Name	Course	Occupation
Flynn, J. J.	VI C	Bookkeeper, Lowell, Mass.
Garner, William	III C	Foreman of Refinery, Warren Bros. Co., Washington, D. C.
Gaunt, A. C.	IIa C	See Evening, 1899.
Goodchild, George	I C	Draftsman, Lowell Machine Shop, Lowell, Mass.
Gray, F. M.	VI C	Machinist, Lowell Machine Shop, Lowell, Mass.
Howard, J.	III C	Overseer, Weaving, Belvidere Woolen Mills, Lowell, Mass.
Higgins, J. A.	IIa C	Spinning, Talbot Mills, No. Billerica, Mass.
Hunter, R.	V C	See Evening, 1901.
Jennings, J. J.	III C	Designer, Lyman Mills, Holyoke, Mass.
Johnson, S. L.	V C	Second Hand, Weaving, Arlington Mills, Lawrence, Mass.
Keleher, J. J.	IIb C	Section Hand, Washington Mills, Lawrence, Mass.
Knowles, F. E.	I C	Overseer, Carding, Merrimack Mfg. Co., Lowell, Mass.
Lawrence, Charles	I C	Overseer, Mule Spinning, Merrimack Mfg. Co., Lowell, Mass.
Leach, J. W.	V C	Lawrence, Mass.
Lincourt, H. L.	VI C	Machinist, Lowell, Mass.
Lord, Wilfred,	IIb C	See Evening, 1901.
Mason, F. A.	I C	Boston El. Ry. Co., Boston, Mass.
Mortenson, C. W.	III C	Asst. Paymaster, Talbot Mills, No. Billerica, Mass.
Moir, A. L.	III C	See Evening, 1899.
Mozley, A.	VI C	Machinist, Heinze Electric Co., Lowell, Mass.
Myers, J. W.	III-IV C	Clerk, U. S. Bunting Co., Lowell, Mass.
Nicholson, Richard	IIb C	Section Hand, Washington Mills, Lawrence, Mass.
Noonan, D. T.	III C	Overseer, Weaving, Knoxville Woolen Co., Knoxville, Tenn.
Palmer, G. B.	III C	Lowell, Mass.
Rockwell, H. D.	IIa C	Clerk, Davis & Furber Co., No. Andover, Mass.
Schofield, J. S.	III C	Pattern Weaver, G. E. Kunhardt, Lawrence, Mass.
Schoon, Fenton	IIb C	Section Hand, Drawing, Pacific Mills, Lawrence, Mass.
Stokham, B. I.	P. G. IV C	Asst. Chemist and Dyer, Bigelow Carpet Co., Lowell, Mass.
Tonge, Matthew	III C	Weaver, Dartmouth Mfg. Co., New Bedford, Mass.

Name	Course	Occupation
Upton, F. A.	I C	Carder, Dana Warp Mills, Westbrook, Me.
Varney, M. H.	I C	See Evening, 1902.
Walker, David	P. G. III C	See Evening, 1902.

#### Day Course, 1904.

Name	Couse	Occupation.
Abbott, E. M.	II D	Westford, Mass.
Baldwin, F. A.	II D	With Davis & Furber Machine Co., No. Andover, Mass.
Clapp, F. A.	II D	Salesman, Earnscliffe Worsted Co., New York City.
Clogston, R. B.	IV D	Chemist, Manchester Print Works, Manchester, N. H.
Culver, R. F.	IV D	Chemist, Glenlyon Dye Works, Providence, R. I.
Cutler, B. W. Jr.	III D	With Catlin & Co., New York City.
Dewey, James F.	II D	Asst. to Supt. Dewey's Mills, Quechee, Vt.
Donald, A. E.	II D	Ashuelot, N. H.
Halsell, E. R.	I C	Student Lowell Textile School, Lowell, Mass.
Horsfall, G. G.	II C	Second Hand, Spinning Room, Kilburn Knitting Machine Co., Martinsburg, West Va.
Jones, E. A.	II C	Inst. Hand Looms, Lowell Textile School, Lowell, Mass.
Jury, A. E.	III D	Asst. Chemist, Cochecho Mfg. Co., Dover, N. H.
Lucey, E. A.	II D	Asst. to Supt. Brighton Mills, Passaic, N. J.
MacPherson, W. A.	III D	Boss of winders, Moosup Mills, Moosup, Conn.
Meadows, Wm. R.	I D	Weaver, Tremont & Suffolk Mills, Lowell, Mass.
O'Donnell, J. D.	I C	Third Hand, Carding, Palmer Mill, Three Rivers, Mass.
O'Hara, Wm. F.	IV C	Color Shop, Merrimack Mills, Lowell, Mass.
Parker, E. N.	I C	Student, Lowell Textile School, Lowell, Mass.
Smith, R. F.	I C	With Lowell Machine Shop, Lowell, Mass.
Stevens, Dexter	I D	With Appleton Co., Lowell, Mass.
Toovey, S. E.	II C	With Talbot Mills, No. Billerica, Mass.



Name	Course	Occupation
Webb, F. H.	III D	Chemist, Apponang Print Works, Apponang, R. I.
White, R. P.	II D	Asst. Supt. Stirling Mills, Lowell, Mass.
Wilson, W. E. H.	I C	Student, Lowell Textile School, Lowell, Mass.

#### Evening Course, 1904.

Name	Course	Occupation.
Adams, M. E.	VI C	Lowell, Mass.
Balmforth, J. H.	II C	See Evening, 1903.
Balmforth, Wm. F.	VI C	Spinner, Talbot Mills, No. Billerica, Mass.
Barker, J. P.	V C	Weaver, Beaver Brook Mills, Col- linsville, Mass.
Barrington, John A.	IV C	Color Chemist, Kuttroff, Pickhardt & Co., New York City.
Boucher, J. L.	VI C	Lowell, Mass.
Butler, B. O.	VI C	Beamer, Lowell Weaving Co., Lowell, Mass.
Callahan, P. A.	VI C	Lower Pacific Mills, Lawrence, Mass.
Cheetham, John Joseph	I C	Asst. Carder, Mass. Mills, Lowell, Mass.
Conley, F. A.	VI C	Machinist, Kitson Machine Co., Lowell, Mass.
Connors, E. F.	VI C	Draftsman, Lowell Machine Shop, Lowell, Mass.
Davis, P. T.	I C	Overseer, Carding, Boott Mills, Lowell, Mass.
Delmage, Edward	III C	Dresser Tender, Sterling Mills, Lowell, Mass.
Dempsey, J. W.	Ila C	Spinner, Bigelow Carpet Co., Lowell, Mass.
Doole, G. L.	VI C	Weaver, U. S. Bunting Co., Lowell, Mass.
Dooley, E. W.	VI C	With Spencer & Co., Lowell, Mass.
Donahue, M. F.	VI C	Second Hand, Lowell Machine Shop, Lowell, Mass.
Duggan, F. P.	VI C	U. S. Cartridge Co., Lowell, Mass.
Frank, E. M.	III C	Section Hand, Weaving, Arlington Mills, Lawrence, Mass.
Gaunt, A. C.	V C	See Evening, 1899.
Hempel, Frank	V C	Weave Room Hand, Washington Mills, Lawrence, Mass.
Higgins, J. A.	IIb C	See Evening, 1903.
Hoyle, Joseph	IIb C	Section Hand, Moore Spinning Co., No. Chelmsford, Mass.

Name	Course	Occupation
Jeannotte, Arthur	VI C	Carpet Finisher, Bigelow Carpet Co., Lowell, Mass.
Kershaw, W. H.	V C	Weaver, Talbot Mills, No. Billerica, Mass.
Langevin, F. D.	VI C	Machinist, Kitson Machine Co., Lowell, Mass.
Lord, H. D.	III C	Lowell, Mass.
Lord, Wilfred	IIa C	See Evening, 1903.
McBride, Robert G.	IIa C	Spinner, Bay State Mills, Lowell, Mass.
Merrill, E. C.	VI C	Draftsman, City Hall, Lawrence, Mass.
Miller, E. H.	V C	Loom Fixer, Lawrence, Mass.
Moorehouse, Thomas	VI C	Student, Phillips Academy, Andover, Mass.
Murphy, J. H.	VI C	Salesman, Putnam & Son, Lowell, Mass.
Notman, F. W.	I C	Clerk, Mass. Cotton Mills, Boston, Mass.
Patrick, Alexander	III C	Weaver, Lowell, Mass.
Reed, F. C. K.	VI C	Engineer, Farwell Bleachery, Lawrence, Mass.
Redman, H. S.	III C	Loom Fixer, Boott Cotton Mill, Lowell, Mass.
Rhodes, J. E.	V C	Wire Sharpener, Mass. Mohair Plush Co., Lowell, Mass.
Rooney, G. W.	I C	Second Hand, Hamilton Mfg. Co., Lowell, Mass.
Shaw, James	V C	Weaver, Plush Mill, Lowell, Mass.
Smith, J. W.	IIb C	Section Hand, Worsted, Arlington Mills, Lawrence, Mass.
Smith, Edward	I C	Second Hand, Boott Mills, Lowell, Mass.
Stokham, B. I.	P. G. IV C	See Evening, 1903.
Sterling, Walter	III C	Lowell, Mass.
Tarpey, J. F.	IIa C	Lowell, Mass.
Thompson, C. B.	VI C	Lowell, Mass.
Webb, Francis H.	V C	Quiller, Plush Mills, Lowell, Mass.

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Fill out and send to Principal

( DAY )

# Lowell Textile School

LOWELL, MASS.

## APPLICATION BLANK

Date.....

I,.....hereby  
apply for admission to the Lowell Textile School as DAY  
student.

Name in Full,.....

Date and Place of Birth,.....

Home Residence,.....

Parent or Guardian,.....

Residence of Parent,.....

School last attended,.....

( INDICATE COURSE )

- |                          |                           |
|--------------------------|---------------------------|
| I. Cotton Manufacturing. | II. Wool Manufacturing.   |
| III. Designing.          | IV. Chemistry and Dyeing. |
| VI. Textile Engineering. |                           |

Signature,.....

ENDORSEMENT BY OFFICER OF SCHOOL LAST ATTENDED

I hereby certify that.....  
the above applicant has completed the regular four years  
course at the.....High School.

Signed :.....

Principal..... School, located  
at..... State of.....

Date.....

FORM FOR EVENING CLASSES ON OTHER SIDE

( EVENING )

Fill out and send to the Principal

# Lowell Textile School

LOWELL, MASS.

## APPLICATION BLANK

Date .....

I, ..... hereby  
apply for admission to the Lowell Textile School as EVENING  
student.

Name in Full, .....

Date and Place of Birth, .....

Home Residence, .....

Parent or Guardian, .....

Residence of Parent, .....

School last attended, .....

( INDICATE COURSE )

- |                                  |                               |
|----------------------------------|-------------------------------|
| I. Cotton Spinning.              | IV. Chemistry and Dyeing.     |
| II. Woolen and Worsted Spinning. | V. Weaving. Warp Preparation. |
| III. Designing.                  | VI. Mechanical Engineering.   |

Signature, .....

ENDORSEMENT BY SOME OFFICER OF SCHOOL LAST ATTENDED

I hereby certify that.....  
the above applicant is duly qualified to pursue with profit the  
work of the Lowell Textile School.

Signed: .....

Principal ..... School, located  
at ..... State of .....

Date .....



# BULLETIN

OF THE

## Lowell Textile School

Lowell, Massachusetts, U. S. A.



ISSUED QUARTERLY

Entered Aug. 26, 1902, at Lowell, Massachusetts  
as second-class matter under Act of  
Congress, July 16, 1894

Moody Street and Colonial Avenue.

R BULLETIN AND TERMS ADDRESS CHAS. H. EAMES, SECRETARY.



# Trustees of the Lowell Textile School

(Incorporated 1895)

Honorary Trustee

FREDERICK FANNING AYER

New York City

## The Corporation

Officers, 1905

A. G. CUMNOCK, PRESIDENT

JAMES T. SMITH, CLERK

A. S. COVEL, VICE-PRESIDENT,

A. G. POLLARD, TREASURER

### Trustees

On the part of the Commonwealth of Massachusetts

A. S. COVEL, Boston, 1908

FRANKLIN W. HOBBS, Brookline, 1906

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Treas. Arlington Mills

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A. K. WHITCOMB,

Supt. of Public Schools

ALBERT F. GRANT

Chairman Board of Aldermen

WM. H. DODGE

Pres. Common Council

MICHAEL DUGGAN, 1905

By appointment of the Lowell Textile Council

### Permanent Trustees

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CHARLES L. HILDRETH, Lowell, Superintendent Lowell Machine Shop  
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THOMAS WALSH, Lowell, Superintendent Hamilton Print Works  
HAVEN C. PERHAM, Lowell, Treasurer Kitson Machine Company  
JAMES T. SMITH, Lowell, Attorney-at-Law  
WALTER E. PARKER, Lawrence, Agent Pacific Mills.  
J. W. C. PICKERING, Lowell, President Pickering Manufacturing Company  
WM. M. WOOD, Andover, Treasurer American Woolen Company  
GEORGE E. KUNHARDT, Lawrence and New York, Woolen Manufacturer  
FRANK E. DUNBAR, Lowell, Attorney-at-Law, and President Appleton Company  
JOSEPH L. CHALIFOUX, Lowell, Merchant  
FRANKLIN NOURSE, Lowell, Agent Lawrence Mfg. Co.  
DR. HENRY S. PRITCHETT, Boston, President Mass. Inst. of Technology  
CHARLES H. HUTCHINS, Worcester, President Crompton & Knowles Loom Works

### Additional Trustees Elected by Alumni Under Act of 1905

For Two Years, from July 1, 1905:

HENRY A. BODWELL, Class of 1900, Assistant Superintendent Smith & Dove Manufacturing Co., Andover, Mass.

For one Year, from July 1, 1905.

PAUL T. WISE, Class of 1901, Superintendent Brookside Mills, West Chelmsford, Mass.

# General Committees

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A. G. CUMNOCK, Chairman      A. S. COVEL      FRANKLIN W. HOBBS  
FREDERICK S. CLARK      ALVIN S. LYON      JOCOB ROGERS  
FRANK E. DUNBAR      A. G. POLLARD      JAMES T. SMITH

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FREDERIC S. CLARK      WALTER E. PARKER

## PHYSICAL CULTURE

FRANK E. DUNBAR      JOSEPH L. CHALIFOUX      JAMES T. SMITH

## DEPARTMENT COMMITTEES

### *Cotton Spinning*

FRANKLIN NOURSE, Chairman      CHARLES L. HILDRETH

### *Woolen and Worsted Spinning*

FRANKLIN W. HOBBS, Chairman      FREDERIC S. CLARK

### *Weaving*

ALVIN S. LYON, Chairman      WALTER E. PARKER

### *Chemistry and Dyeing*

THOMAS WALSH, Chairman      EUGENE S. HYLAN

### *Decorative Art*

JAMES T. SMITH, Chairman      FREDERICK LAWTON

### *Designing and Finishing*

FREDERICK S. CLARK, Chairman      GEORGE E. KUNHARDT

### *Mechanical and Electrical Engineering*

HAVEN C. PERHAM, Chairman      ALVIN S. LYON

## Addition to Equipment.

During the last 18 months the equipment of each department of the school has been carefully gone over and brought up to the standard requirements. Large additions have been made to the qualitative and quantitative analysis and dyeing laboratories to meet the needs of the increasing number of pupils. A complete outfit of French Spinning machinery has been ordered from the Societe Alsacienne de Constructions Mecaniques through Stoddard, Haserick, Richards & Co., of Boston, to be in place early in October. This set with the English and American machinery formerly installed in the woolen and worsted department for carding and spinning woolen and worsted yarns covers fully the two leading worsted spinning processes—the Bradford or English system and the French or Continental system. In addition, full provisions for treating wool in the raw stock—sorting, scouring, carbonizing and conditioning—has been made. A competent instructor has also been added to the department to assist in instruction in these branches.

An able and experienced specialist in physics, mathematics, and electrical engineering, has been added to the instruction corps of the department of textile engineering. The demands from manufacturers for original research and experimental work have called for a considerable addition of “instruments of precision” to the engineering and chemical departments. These add to the equipment which is available for instruction purposes.

The capacity of the power plant has been increased from 200 H. P. to 500 H. P. Additions have been made to the number and variety of looms of the weaving department. Manufacturers of the various machines which make up the present equipment are keeping constant watch of their respective machines, adding their latest improvements, thus keeping the equipment up to date.

One new department, that of finishing, and a new division, commercial dyeing, will open with the fall term fully equipped with machinery of the best makes.

Ample and convenient floor space is provided in a group of imposing buildings on a commanding site of twelve acres on the north bank of the Merrimack River overlooking the falls of Pawtucket.

An educational system has been developed, thoroughly American, that meets the needs of the graduates of the highest general educational institutions as well as the humblest operative if he has had the ambition to avail himself of the opportunities so freely offered by the public evening schools to speak and write intelligible English and acquire the elements of arithmetic. For mental training it is held that mathematics is a complete and sufficient substitute for the dead languages, and instruction therein is thorough, extending to and embracing the calculus.

A more accurate title of the institution would be the "Lowell Textile Schools" for each department is substantially for purposes of instruction, a distinct school, in fact, at the modern Aix la Chapelle Industrial School they are so classed. It has been the aim to secure in the chiefs of departments or schools the ablest talent, not only for instruction in the specialties of their respective departments but for experimental and original research work called for constantly by manufacturers in the solution of problems daily presented in the production of fabrics. To encourage constant striving for greater excellence it has been found desirable that in the reports of special expert work which go out, responsibility therefor should be exactly fixed by giving due credit to the expert. Thus an opportunity will be offered to make individual reputation or disclose lack of qualifications should it exist. At the same time efficient, central supervision and administration of the institution as a whole is maintained. As a result of considerable experience the position of Director or Principal of the school has been eliminated and the responsibility for the general administration of the school proper fixed in the President of the Corporation, the chief executive officer of a great textile corporation with



a life time experience in textile manufacture, with a resident Secretary at the school. The qualifications desirable for Secretary are thorough education in the sciences and arts on which the textile industry depends, especially engineering, and trained habits of order, system and industry with executive ability. After over one year's experience with the present incumbent the Trustees are confident they have in Mr. Charles H. Eames, S. B., a graduate of the Massachusetts Institute of Technology, with large experience in engineering and superintendence, especially in the electrical field, an officer who will ably and conscientiously perform the duties of this position.

It will be observed from the foregoing that the period of the establishment of this school is substantially closed though necessarily annual additions will be required to the equipment to keep pace with the inventions and improving methods of a progressive industry.

The roster of pupils for the term closed in June shows 141 day pupils, the previous education of whom was: college and university 24, high school and academy 99, minor schools (admitted on examination) 18, and 588 evening pupils, mostly from the mills and shops ranging in occupation from bobbin-boy to assistant superintendent.

In developing the school to the importance it has reached the Trustees have had to solve many problems financial, administrative, architectural, and educational, working in what was substantially a new field and without a model. They have kept a clearly defined object in view, namely, the furthering of the interests of the textile industry of the Commonwealth; of those who have invested and those who are employed therein.

The following roster shows the previous education and experience of the school officials and instructors.

## ADMINISTRATION

---

A. G. CUMNOCK, PRESIDENT, Treasurer Appleton Co. (Cotton)

CHARLES H. EAMES, S. B., SECRETARY.

---

## INSTRUCTORS

---

### Engineering

George H. Perkins, S. B., chief instructor in mechanical engineering Massachusetts Institute of Technology, 1899. Experience: draftsman Ludlow Manufacturing Company.

Charles H. Eames, S. B., instructor electrical engineering and mathematics; is the secretary of the school. Massachusetts Institute of Technology, 1897. Experience: superintendent Light, Heat and Power Company, Lowell, and assistant superintendent with Stone & Webster, electrical engineers. Boston, Mass.

George E. Marsh, S. B., instructor in mathematics, physics and electrical engineering. Massachusetts Institute of Technology, 1901. Experience: Research Dept. of General Electric Company; Instructor Mathematics and Physics, Adrian College. Instructor physics and mathematics, Case School Applied Science, Cleveland.

### Chemistry and Dyeing

Louis A. Olney, A. C., chief instructor. Lehigh University, 1896. Experience: instructor Brown University.

G. Carl Spencer, S. B., instructor in chemistry. Worcester Polytechnic Institute, 1897.

John B. Reed, A. B., instructor in chemistry, University of Michigan, 1903. Experience: Instructor of chemistry, University of Maine two years.

Herbert F. Schwarz, instructor in dyeing. University of Dublin. Associate of Royal College of Science for Ireland. Experience: with Levinstein & Co., dye stuffs and chemicals, Manchester, Eng.

Russell W. Hook, assistant instructor in dyeing. Lowell Textile School, 1905.

### Decorative Art

Vesper L. George, chief instructor. Pupil of the Julian Academy, Paris. Experience: instructor State Normal Art School, and principal Evening School of Design, Boston, Mass.

Ida A. Woodies, instructor. Lowell Textile School, 1900. Pupil of Dr. Denman W. Ross, lecturer in design, Harvard University.

### Design

Fenwick Umpleby, chief instructor. Honors graduate textile department, Victoria College, Leeds, Eng., 1884. Experience: chief designer, Gilbert Manufacturing Company, Massachusetts, and Globe Worsted Mills, New York.

Everett A. Jones, instructor in hand loom weaving. Phillips Academy; Lowell Textile School, 1904. Experience: at Aiken, Franklin Woolen and Squam Lake Woolen mills.

Arthur F. Ferguson, instructor. Lowell Textile School, 1903. Experience: Chapman, Kendal & Daniels, wholesale dry goods, Boston, Mass.

### Cotton Yarn

Stephen E. Smith, chief instructor. Lowell Textile School, 1900. Experience: draftsman, Lowell Machine Shop, and at Atlantic Cotton Mills and Shaw Stocking Company.

Arthur L. Willey, instructor cotton yarns and knitting. Experience: overseer principally in carding, eight years at Palmer, Moosup, Samoset and New England Cotton Yarn Companies.

### Woolen and Worsted Yarns

Edgar H. Barker, chief instructor. Massachusetts Institute of Technology, 1896. Experience: Pacific Mills five years; E. Frank Lewis, wool scourer, one year.

Frank W. Emerson, instructor. Lowell Textile School, 1903. Experience: Crescent Woolen Company and Rutter Bros., Lawrence; assistant instructor wool sorting, scouring, carbonizing, conditioning, etc.

John N. Howker, assistant instructor. Technical School of Saltaire, near Bradford, England. Certificate from City and Guilds of London. Experience : Saltaire Mills, Yorkshire, England; Goodall Worsted Co., Sanford, Maine; Arlington Mills, Lawrence.

### Warp Preparation and Power Weaving

William Nelson, chief instructor. Harris Institute, Preston, Eng.; certificate of City and Guilds Institute, London, Eng. Experience: Springfield and Alexandria Mills, Preston; overseer, Jacquard Weaving North Manufacturing Company, Chorley, Eng., and Ponemah Mills, Taftville, Conn.

Edward Nelson, instructor. Evening course, New Bedford Textile School. Harris Institute, Preston, Eng., 1889. Experience: Springfield and Bristol Mills, Preston, Eng., and overseer Chenango Silk Company, New York.

Joseph Wilmot, instructor. Experience: loom fixer, U. S. Bunting Company.

### Finishing

Arthur A. Stewart, chief instructor. Lachine Academy, Canada; Lowell Textile School, 1900. Experience: Dominion Woolen Manufacturing Company, Montreal, Can.; Bay State, American Woolen and Nonatum Manufacturing Companies.

### Commercial Languages.

Paul E. Kunzer, Ph. D., chief instructor. New England College of Languages, Boston.

Having in mind that the great body of our day graduates enter the school directly from school without experience in mill or shop and the long apprenticeship required to rise through mill experience alone to leading and remunerative positions in the industry, the following record of their occupations at the commencement of the current year will be instructive and indicate of what value the education they received at the school has been to them and how it is appreciated by employers.

For present occupation of evening graduates who mostly entered from the mills and shops; see catalogue of 1905 and 1906, pages 116, *et. seq.*

## LIST OF PAST DAY STUDENTS

Showing Position at Last Advices.

C Indicates Certificate, Partial Course.  
 D Indicates Diploma, Complete Course.  
 P G Indicates Post Graduate Course.  
 || Indicates Last Known Address.  
 \* Deceased.

### Day Course, 1899.

Name	Course	Occupation.
Bailey, J. W.	I D	Principal, Bradford-Durfee Textile School, Fall River; Mass.
Burrage, Katherine	IIIb C	Teacher, Evening Drawing School, Lowell, Mass.
Cuttle, J. H.	II D	Designer, Arlington Mills, Lawrence, Mass.
Fels, A. B.	II D	Sec. to Gen. Mgr. Mass. Electric Co., Boston, Mass.
Harriman, H. I.	V	Agent American Loom Co., Readville, Mass.
Hastings, Walter L.	I	Asst. Agent Arlington Mills, Lawrence, Mass.
Harmon, C. F.	I D	In business, Lowell, Mass.
Mackay, R. N.	I	Selling Agent American Loom Co., Readville, Mass.
Smith, A. A.	I D	Lowell, Mass.
Tilton, E. T.	II D	Electrician, American Trackless Trolley Co., Boston, Mass.

### Day Course, 1900.

Name	Course	Occupation.
Baldwin, A. L.	IV D	Chicago, Ill.
Barr, I. W.	I D	Designer, Lawrence & Co., New York City.
Bodwell, H. A.	II D	Asst. Supt. Linen Thread Mill, Smith & Dove, Andover, Mass.
Brickett, C. J.	II D	Asst. Prin. International Correspondence School, New Bedford, Mass.
Burrage, Katherine, (P.G.)	IIIb C	See Day Course, 1899.
Campbell, Laura E.	IIIb C	Designer, Lowell, Mass.
Harrison, Mrs. Amy H. (Goodhue)	IIIb C	Dracut, Mass.
Lakeman, Fannie S.	IIIb C	Designer, Salem, Mass.

Name	Course	Occupation.
Lamson, G. F.	I D	Draftsman, Brighton Mills, Passaic, N. J.
Leach, J. P.	I & V C	Foreman Carding Dept., Harriet Cotton Mills, Henderson, N. C.
Merchant, Edith C.	IIIb C	Designer, Lowell, Mass.
Parker, H. C.	V C	Enfield, N. H.
Perkins, John E.	III D	Asst. Supt. and Designer S. W. & C. Russell Woolen Mills, Pittsfield, Mass.
Pradel, A. J.	III D	Designer, Knoxville Woolen Co., Knoxville, Tenn.
Sleeper, Robert R.	IV D	With H. A. Metz & Co., New York City.
Smith, S. E.	I D	Head Instructor Cotton Spinning, Lowell Textile School, Lowell, Mass.
Stewart, A. A.	II D	Head Instructor in Finishing, Lowell Textile School, Lowell, Mass.
Syme, J. F.	II D	Agent Ray Mills, (American Woolen Co.,) Franklin, Mass.
Thompson, H. J.	IV D	Dyer, Boston Rubber Shoe Co., Malden, Mass.
Woodies, Ida A.	IIIb C	Asst. Instructor, Art Dept., Lowell Textile School, Lowell, Mass.

#### Day Course, 1901.

Name	Course	Occupation.
Bradley, Richard	V C	Loom Fixer, Atlantic Mills, Providence, R. I.
Buchan, D. C.	II D	Overseer Weaving, Atlas Linen Co., Meredith, N. H.
Currier, John A.	II D	Asst. Supt. Haile & Frost Mfg. Co., Hinsdale, N. H.
Ewer, N. T.	IV D	Chemist, American Dyewood Co., Boston, Mass.
Foster, C. E.	II D	Second Hand Card Room, American Woolen Co., Winooski, Vt.
Harrison, Mrs. Amy H. Goodhue (P.G.)	IIIb C	Dracut, Mass.
Kingsbury, P. F.	IV D	Asst. Color Maker, Hamilton Print Works, Lowell, Mass.
Marinel, W. N.	I D	Mechanical Engineer, DeBona Bros. Marble Co., Quincy, Mass.
Minge, J. C.	I C	Sec.-Treas. Minge Mfg. Co., Demopolis, Ala.
Moorhouse, W. R.	IV D	Color Chemist, Cassella Color Co., Boston, Mass.
Parker, B. M.	I D	Inst. Carding and Spinning, Clemson College, N. C.



Pratt, A. S.	I	Agent Edwards Mfg. Co., Augusta, Me.
Webber, A. H.	IV D	Chemist, F. E. Atteaux Co., Boston, Mass.
Wise, P. T.	II D	Supt. Brookside Mills, West Chelmsford, Mass.
Woodies, Ida A.	(P.G.) IIIb C	See Day Course, 1900.

### Day Course, 1902.

Name	Course	Occupation.
Burnham, F. E.	IV D	Chemist, Passaic Print Works, Passaic, N. J.
Carter, Robert A.	IV D	Supt. Bleaching Station, Roessler & Hasslacher Chemical Co., Perth Amboy, N. J.
Craig, C. E.	III D	Purchasing Agent, Meriden Dairy Co., Kansas City, Mo.
Curran, C. E.	II C	Asst. Designer, Washington Mills, Lawrence, Mass.
Ferguson, A. F.	I C	Instructor, Design Dept., Lowell Textile School, Lowell, Mass.
Harris, George S.	I C	Supt. Sycamore Mills, Sycamore, Ala.
Haskell, Walter F.	IV D	Overseer of Dyeing, Dana Warp Mills, Westbrook, Me.
Holgate, Benj.	III C	Store and Bookkeeper, Lowell Textile School, Lowell, Mass.
Ramsdell, T. E.	I D	Agent Monument Mills, Housatonic, Mass.
Swift, E. S.	III D	Catlin & Co., Boston, Mass.
Wing, C. T.	III D	Designer, Middlesex Co., Lowell, Mass.
Woodman, H. L.	I C	Draftsman, Lowell Machine Shop, Lowell, Mass.

### Day Course, 1903.

Name	Course	Occupation.
Bennett, E. H.	V C	F. P. Bennett & Co., New York City.
Bloom, W. N.	IV D	Chemist, Berlin Aniline Co., New York City.
Campbell, O. S.	II D	With American Felt Co., Dolgeville, N. Y.
Campbell, Louise P.	IIIb C	Designer, Lowell, Mass.
Chamberlin, Frederick E.	I D	With China, Webster and Pembroke Mills, Suncook, N. H.
Emerson, F. W.	II D	Instructor, Woolen and Worsted Yarn Dept. Lowell Textile School, Lowell, Mass.

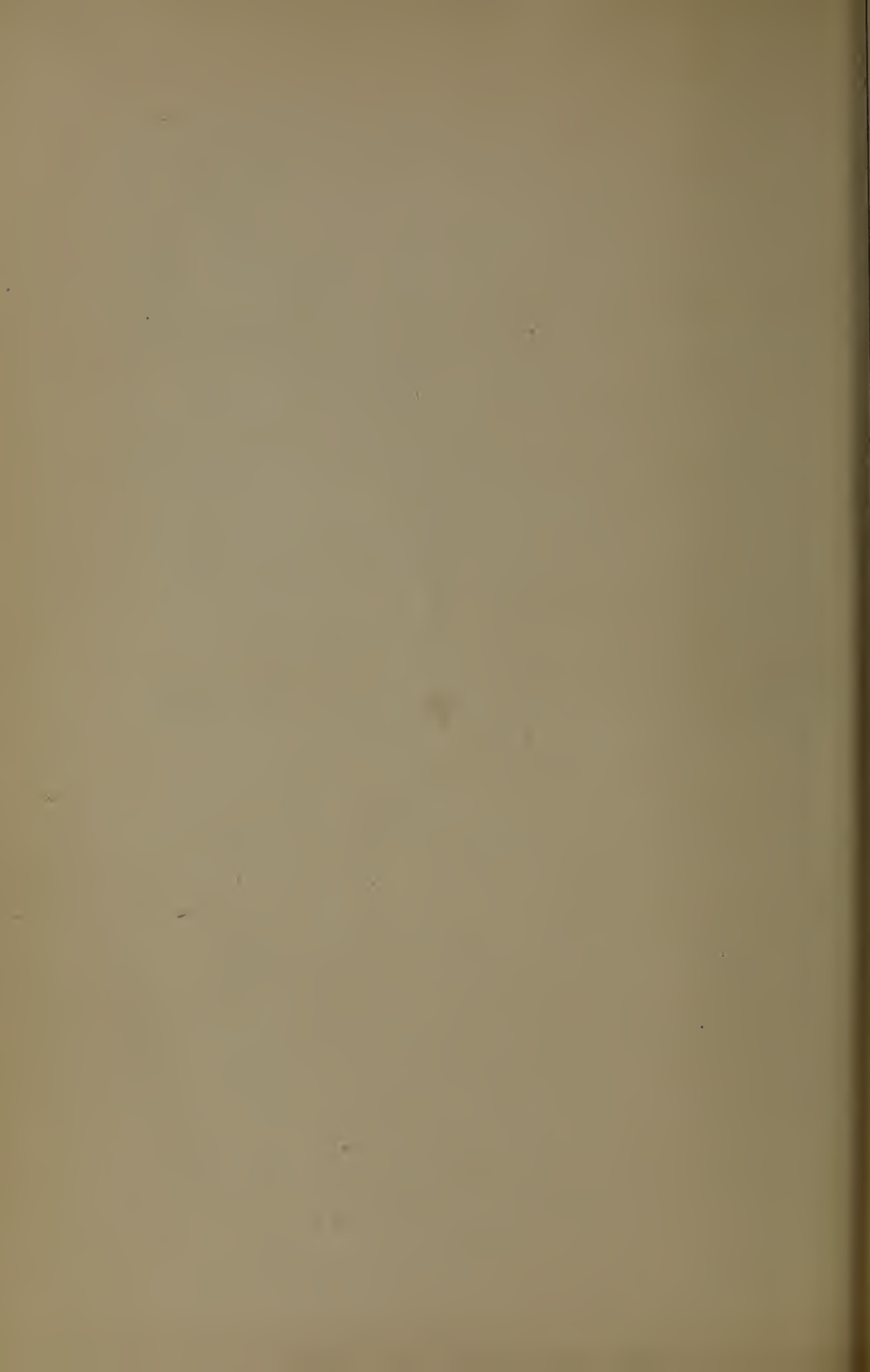
Name	Course	Occupation
Evans, Wm. R.	III D	Bradford, Mass.
Evans, A. W.	III D	Arlington Mills, Lawrence, Mass.
Ferguson, Arthur F.	I D	See Day Course 1902.
Fuller, George	I D	Designer, Eclipse Mills, Arnold Print Works, No. Adams, Mass.
Gerrish, Walter	III D	Malden, Mass.
Holgate, Benj.	V C	See Day Course, 1902
Hutton, Clarence	III C	Director, Textile Dept, Am. School of Correspondence, Chicago, Ill.
Morrison, Fred C.	I D	Clerk, L. W. Phelps, Ayer, Mass.
Najarian, Garabed	IV D	Dyer, Monument Mills, Housatonic, Mass.
Petty, George E.	I C	Shipping Clerk, Wiscasset Mill Co., Albemarle, N. C.
*Rasche, Wm A.	III D	
Reynolds, Isabel H.	III C	Designer, No. Andover, Mass.
Robinson, Wm. C.	III C	Asst. Designer, Solway Mills, Westerly, R. I.
Rosenthal, John S.	II D	Designer, U. S. Bunting Co., Lowell, Mass.
Snelling, Fred N.	II D	Salesman, with J. B. McMurtry, Brooklyn, N. Y.
Spiegel, Edward	V C	Wool Sorting, U. S. Bunting Co., Lowell, Mass.
Stevenson, M. R.	III C	Designer, The Russell Mfg. Co., Middletown, Conn.
Stewart, W. L.	III D	Designer, Clarence Whitman & Co., New York City.
Walker, Anna G.	IIIb C	Teacher of Painting, Lowell, Mass.

#### Day Course, 1904.

Name	Course	Occupation
Abbott, E. M.	II D	Westford, Mass.
Baldwin, F. A.	II D	With Davis & Furber Machine Co., No. Andover, Mass.
Clapp, F. A.	II D	Salesman, Earnscliffe Worsted Co., New York City.
Clogston, R. B.	IV D	Chemist, Manchester Print Works, Manchester, N. H.
Culver, R. F.	IV D	Chemist, Glenlyon Dye Works, Providence, R. I.
Cutler, B. W. Jr.	III D	With Catlin & Co., New York City.
Dewey, James F.	II D	Asst. to Supt. Dewey's Mills, Quechee, Vt.
Donald, A. E.	II D	Washington Mills, Lawrence, Mass.
Halsell, E. R.	I C	Student Lowell Textile School, Lowell, Mass.
Horsfall, G. G.	II C	Second Hand, Spinning Room, Kil- burn Knitting Machine Co., Martinsburg, West Va.

Name	Course	Occupation
Jones, E. A.	II C	Inst. Hand Looms, Lowell Textile School, Lowell, Mass.
Jury, A. E.	III D	Asst. Chemist, Cocheco Mfg. Co., Dover, N. H.
Lucey, E. A.	II D	Asst. to Supt. Brighton Mills, Passaic, N. J.
MacPherson, W. A.	III D	Boss of winders, Moosup Mills, Moosup, Conn.
Meadows, Wm. R.	I D	Principal of Textile Dept. Miss. State Agriculture School, Miss.
O'Donnell, J. D.	I C	Third Hand, Carding, Palmer Mill, Three Rivers, Mass.
O'Hara, Wm. F.	IV C	Color Shop, Merrimack Mills, Lowell, Mass.
Parker, E. N.	I C	Student, Lowell Textile School, Lowell, Mass.
Smith, R. F.	I C	With Lowell Machine Shop, Lowell, Mass.
Stevens, Dexter	I D	Designer, Parkhill Mfg Co., Fitchburg, Mass.
Toovey, S. E.	II C	With Talbot Mills, No. Billerica, Mass.
Webb, F. H.	III D	Chemist, Apponaug Print Works, Apponaug, R. I.
White, R. P.	II D	Asst. Supt. Stirling Mills, Lowell, Mass.
Wilson, W. E. H.	I C	Student, Lowell Textile School, Lowell, Mass.

J. T. S.



# BULLETIN

OF THE

## Lowell Textile School

Lowell, Massachusetts, U. S. A.



ISSUED QUARTERLY

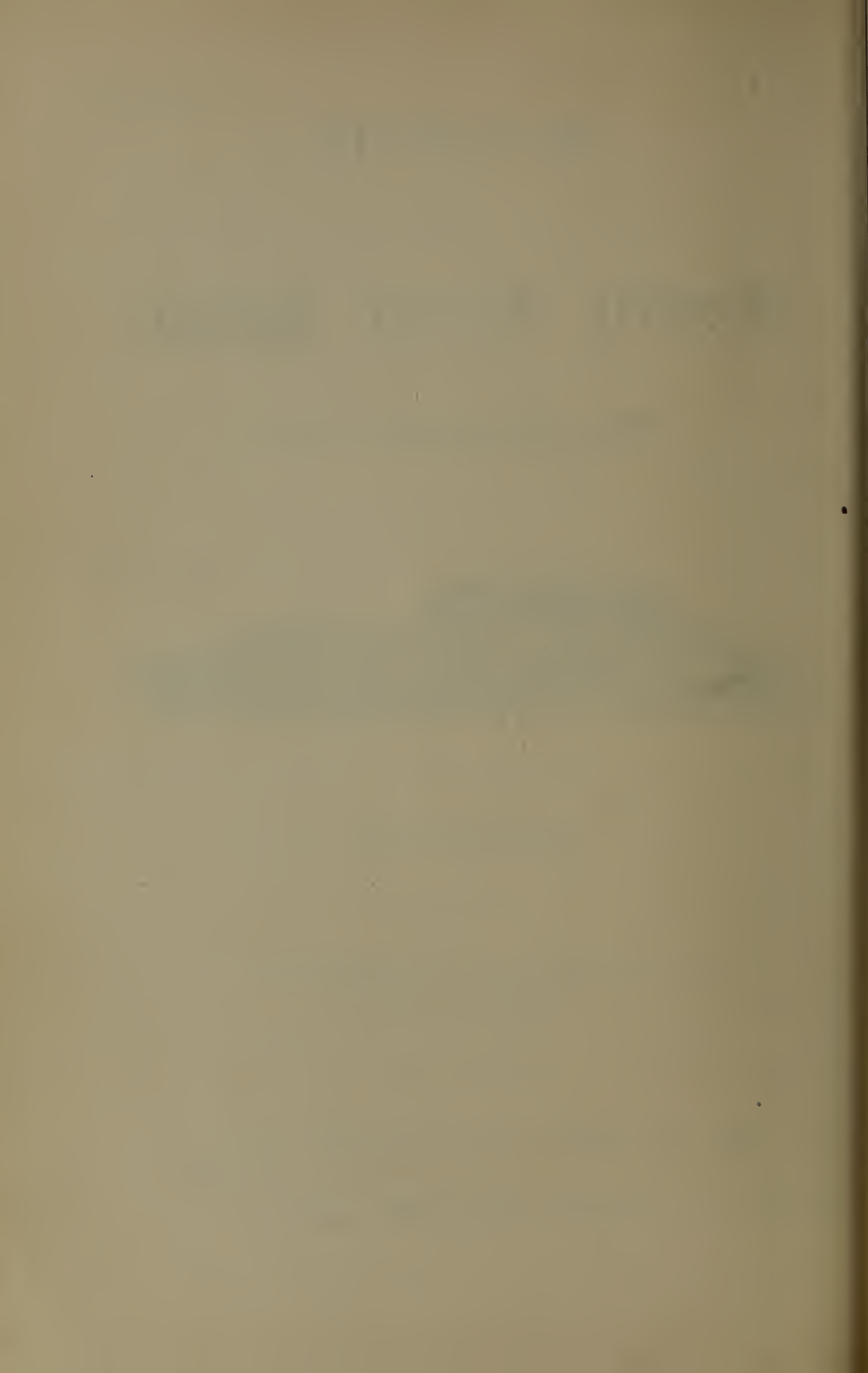
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Entered Aug. 26, 1902, at Lowell, Massachusetts  
as second-class matter under Act of  
Congress, July 16, 1894

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Moody Street and Colonial Avenue

FOR BULLETIN AND TERMS ADDRESS CHAS. H. EAMES, SECRETARY.





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(Incorporated 1895)

## Honorary Trustee

FREDERICK FANNING AYER

New York City

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HENRY A. BODWELL, Class of 1900, Assistant Superintendent Smith & Dove Manufacturing Company, Andover, Mass.

For One Year, from July 1, 1905:

PAUL T. WISE, Class of 1901, Superintendent Brookside Mills, West Chelmsford, Mass.

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# Industrial Education

The annual fall meeting of the New England Association of Public School Superintendents was held at the Lowell Textile School, November 10, 1905. In addition to the regular business of the Association, the topic "Industrial Education" had been set down for discussion. In opening the discussion Trustee James T. Smith spoke as follows:—In dealing with the topic your chairman some time ago invited me to speak to, and having in mind that an able and thoroughly representative official commission provided for at the last session of the Massachusetts Legislature is studying the subject of industrial education, giving hearings at all important industrial centres of the state with the view of fully informing the Legislature as to the economic and perhaps sociological value thereof, I have assumed that the time I am to occupy can be most profitably employed in presenting the facts of personal experience in connection with the establishment and development of the Lowell Textile School.

What are the conditions which called for this school?

In the Merrimack valley was first established, on an extensive scale, the manufacture of the coarser cotton textiles by power weaving, beginning at Lowell and gradually extending to the other great water powers of the river and finally to those of its numerous tributaries.

Our manufacturers early came into competition with English Lancashire for the Eastern Asia markets, and by thoroughness of administration, rigid economies, involving low wages, long hours, the utilization of child labor to an extent that compelled legislation, etc., they won. The honest character of their fabrics established them as standards and their trade marks became very valuable. Although Massachusetts is spending from \$7,000,000 to \$10,000,000 annually on the public schools you supervise, manufacturers have been able to utilize but a meagre percentage of the intelligence thus created. They have searched the world over to find operatives accustomed to conditions of living and a wage which our people would not accept, and thus they held the markets they had won.

Then came southern competition in coarser lines. It was found that the south offered conditions for making the coarser cotton fabrics at lower cost than they could be made on the Merrimack. Northern capital that had been going to the extension of our local

textile industries, began to flow south until our own corporations were compelled to duplicate there their plants or go out of the coarse textile business.

To retain our leading industry we must go into the higher, finer, and more varied fabrics, as the foreign manufacturer did when we successfully competed in the coarser lines. Mr. Arthur G. Schofield of Manchester, England, in a recent article republished by the Textile World Record, referring to American competition says: "The answer we give is, she (America) consumes 90 lbs. of cotton per spindle per annum; we, with the best of everything, only 35 lbs. showing her to be engaged with the cheap, coarse counts, and us with the costlier, fine." We were exporting cotton fabrics the raw materials of which, mostly from the south, represented 75 per cent of what we sold them for, and the brains, skill and profits but 25 per cent, while we were importing cotton fabrics in very much larger quantities in which the ratio of raw material to brains, skill and profits was as 1 to from 10 to 40 and even more. This explains why during the recent speculation in raw cotton, when the price compelled our manufacturers to stop buying, the foreign manufacturer continued to purchase. Where so large a percentage of our standard fabrics is raw material the value of the most efficient service at the mills is often lost through a very small speculative fluctuation in the price of cotton, while the foreign manufacturer of finer goods scarcely feels the effect.

But the finer fabrics require higher skill, and the changes from the coarser to the finer and more varied fabrics requires a change from the so called practical or rule of thumb methods to scientific methods. The industry must draw more largely on sciences and arts applicable thereto. More complex machinery is required, more exact methods, more varied processes; hence, the necessity for the scientific technical school.

Studying foreign industrial, educational systems I found them to be the main reliance especially in Germany for lifting the industries to this higher plane. I proposed to the late President Walker of the Massachusetts Institute of Technology, the establishment of this school as a department of the Institute, but located in Lowell, as the practice abroad is universal to locate industrial schools at the centres of the industries to which they relate. The roster of the Lowell School of Applied Design established for textiles and which had assembled some textile machinery, after some twenty years of

existence in Boston as a free school with able instructors, showed but 15 pupils in textiles.

At several conferences the late President Walker manifested much interest but it was evident that the demands of existing departments of the Institute would not permit of action for some years.

As the necessity for the school was urgent, the facts gathered and conclusions made therefrom were, therefore, presented at a conference with the leading representatives of the Lowell mills at Lowell and an association for incorporation soon secured.

An act known as the four school bill was passed at the next session of the Legislature, being Chapter 475 of 1895. The State pledged a grant of \$25,000 when the city should appropriate a like amount and authorized the incorporation of Trustees for establishing and maintaining at Lowell, Lawrence, New Bedford and Fall River, textile schools for instruction in the theory and practical art of textile and kindred industries. Lowell and Lawrence united for one school. When the City of Lowell attempted to negotiate a loan for the school it was met by a legal opinion that the act before referred to was unconstitutional, because money raised by taxation for schools could only be applied for public schools. The issue reached the Supreme Court where the school act was held to be constitutional under the provisions of another section which enjoined upon the Legislature the duty of encouraging manufactures.

The corporation known as the Trustees of the Lowell Textile School is composed of 20 permanent trustees, mostly treasurers, agents, or superintendents of leading mill or textile machinery corporations of the Commonwealth, two trustees appointed by the Governor and Council for four year terms, the Mayor, Superintendent of Public Schools, chairman of the Board of Aldermen, and President of the Common Council of Lowell, a representative of a labor organization, and two trustees elected for two year terms by the graduates of the school.

The school was opened for pupils February 1, 1897, in rented rooms affording about 10,000 sq. ft. of floor space. It now occupies about 117,000 sq. ft. and has a permanent home in three large halls or buildings on a site of about 12 acres, affording ample room for out door athletics and for extension of buildings.

It was at first placed in charge of a Director of considerable experience in England as instructor and examiner of textile schools. Details were largely left to him, he being held responsible for results. But the English schools were substantially trade schools of the



ancient pattern, a class of schools that the wage earners usually antagonize, because as they claim, the effect is to increase the supply of the average and ordinary operative and thus decrease the wage. The result was that the methods of instruction at first took the English form and the school was classed, and properly so, as a trade school arousing prejudice among mill operatives. Such had not been the character intended as evidenced by the proposition to make it a department of the Massachusetts Institute of Technology, and therefore the contract with our director when it terminated, was not renewed.

A depression in textile manufacturing enabled the Trustees to give more time to the school than they at first believed would be required of them. Sub-committees for the respective departments were appointed. One chairman with his engineering staff, one member of which had served ten years as Chief of Mechanical Engineering at the Massachusetts Institute of Technology, came to the school and so thoroughly perfected a system of instruction in cotton manufacture that it continues substantially as he established it. Others have advised and assisted in their respective departments; general committees on equipment, building, Legislative petitions, Lectures, Ways and Means, Finance, etc., were created. President Pritchett, of the Massachusetts Institute of Technology kindly accepted a place on the Board of Trustees and we had the benefit of his counsel and support. Being statutory clerk of the corporation, as the corporation retained the control of the providing of a permanent home, the equipment thereof, the assembling of a corps of instructors, the outlining of a scheme of instruction, and the raising of the necessary means, I have unexpectedly become for a time substantially a resident trustee. I make this explanation because in styling me Secretary of the school on your program injustice is unintentionally done to a most able and worthy official, Mr. Charles H. Eames, who is the chief resident official of the school proper, officially known as Secretary. He is a graduate of the Massachusetts Institute of Technology with large experience as a Mechanical and Electrical Engineer and fully able to deal intelligently and exhaustively with the technical problems presented from time to time as I am not.

A division of engineering was established for instruction in Mechanism and Mechanical and Electrical Engineering, and Mr. Wm. W. Crosby, a bright graduate and afterwards assistant instructor at the Massachusetts Institute, was secured as chief instructor; he was also to act as Principal of the school under the general supervision



of the President. He was instructed to conform to the methods of the Institute so far as they were applicable. His increasing duties later required the employment of a secretary, Mr. Eames, and this summer when Mr. Crosby was called to a responsible position outside, the secretary succeeded him as chief resident administrator of the school. It is provided that the President of the Board of Trustees shall also be recognized as the President of the school proper, he meeting at frequent stated intervals the Head Instructors of the several departments, or the Faculty, the school secretary being directly responsible to him. Thus in our general administrative organization we now substantially conform to the organization of the Massachusetts Institute of Technology.

The school now comprises departments, (or schools as they are sometimes styled abroad) of Engineering, Cotton Yarns, Woolen and Worsted Yarns, Weaving, Finishing, Decorative Art, Textile Design, Chemistry and Dyeing, and Commercial Languages. There are also special divisions for original research and experimentation and a course of lectures on special subjects connected with the industry.

The organization for instruction naturally falls into three grand divisions; Textile Engineering including Heat, Light, Power, Mechanism, Mechanical Engineering and Mathematics, and the application thereof in opening, carding, combing, spinning, weaving, and finishing of all commercial fibres and fabrics; Decorative art and textile design; Chemistry and dyeing.

The day course is three years with two terms each year. Frequent examinations are held and a final examination with thesis of candidates for graduation.

The management being more and more impressed with the importance of first laying a solid foundation in the knowledge of the sciences and arts applied in or applicable to the respective processes of textile manufacture before passing to the manipulation of fibres or production, has continued to strengthen the engineering department proper, the members of the instruction staff of which, are all graduates of the Massachusetts Institute with experience outside. Mr. George H. Perkins succeeded Mr. Crosby as chief of engineering, and a recent addition, Mr. George E. Marsh, comes with wide experience as an instructor in General Physics and in the higher mathematics and electricity, and a record for original research work.

Of the day pupils of the year last closed, 24 were from the colleges and universities, 99 from the high schools and academies, 12 from grammar schools, and 6 from private schools.

While a curriculum, a form of organization for instruction and methods, that it was hoped would meet the requirements, was outlined at the first, the nature of the demand from the schools, mills and shops, as it developed, was to determine the permanent character and methods of the school.

There are day courses embracing general manufacturing, and special courses where the fundamental instruction in art and science is applied only to distinct branches of the industry.

From the higher institutions come those who have had a preliminary instruction in science and mathematics, and for these shorter applied courses are provided, unless, as is generally the case, they desire to take the entire regular course. A few special students are received in partial courses or specialties.

Instruction is also given in the evening. The evening pupils are mainly from the mills and shops, and range from the humblest operatives who have had but little common school training to graduates of Harvard, Yale, Brown, Dartmouth, Tufts, Princeton, Amherst, the Massachusetts Institute of Technology, Worcester Polytechnic Institute, and the University of Maine who are this year registered in the classes. This wide variation in acquirement presented a difficult problem.

Abroad caste so prevails that the industrial schools have to, or do recognize it; one in seeking an education is presumed not only to have chosen his industry for life, but the grade he is to occupy permanently therein. Hence, separate schools are provided for the ordinary operative, for the minor superintendencies, for major superintendencies, for captains of industry, and for various specialties connected with each industry. The pupil substantially determines his life work when he chooses his school.

The character of our people and institutions does not admit of such a sociological or industrial curdling or separation into classes, and the school organization must therefore be adapted to our conditions.

We therefore offer but one educational ladder to all though the pupils enter on different rungs as their previous education may compel. All may aspire to the top, for it is assumed that all pupils, day or evening, whether for the full or partial courses, enter for the diploma.

There are more courses for evening than day instruction. A pupil may take one or more as his time will permit. A certificate is

granted him if he passes the required examination for such course. Many evening pupils drop out when they have achieved one specialty, but others are multiplying their certificates and are well advanced for the graduation diploma.

To adjust the methods to the humbler pupil, instruction at first is mainly object teaching. A textile machine is separated into its principal parts, each part being mounted on a moveable stand to bring it in view of large classes; each detail is explained and its relation to a combination to produce a desired motion. When all this is understood the parts are assembled to produce the complete machine the student being taught to so assemble them.

In such course of instruction the various elementary mechanical principles which are applied are so thoroughly fixed in the mind of the pupil that he should be able to differentiate and recognize them wherever found. Thus while becoming thoroughly familiar with some textile machine he may be called to operate, and hence a more valuable and intelligent operative, he at the same time takes a step in a regular course in the science of mechanism. If at the same time he takes up or keeps up the study of arithmetic he in time reaches the level of the day student at entry to the day course in engineering and may with persistence finally achieve equal rank therein.

Heretofore as textile instruction was a novelty, we have not been over rigid in examination for the evening classes, and as the City of Lowell in appropriating for the school requires free instruction to residents of the city, the growth of the evening classes has been phenomenal. Last year we simply required for entry ability to speak and write English, and provided elementary instruction in arithmetic. On consideration it was thought that this additional preparatory work should be omitted and applicants should be required to avail themselves of the facilities offered by the evening public schools for acquiring some knowledge of arithmetic and other essential rudiments of a common English education. While the enforcement of this requirement has probably reduced somewhat the number of evening pupils from Lowell, the number of pupils from out of town has increased, as have also the day classes. Further, we have found a disposition throughout the state to leave the high school for the textile school before completing the course. Some objection has been made to this. The high school and academy diplomas have always been received for matriculation but pupils without them can be admitted upon examinations equivalent to those required for such diplomas. The rule is now made rigid. This has resulted in some

losses in some courses but the number has been more than made up as the roster for this year shows an increase over that of last year in day students of about 50 percent.

The results of our instruction are shown annually in our catalogue and by a comparison of the annual rosters of how and where our graduates, both diploma and certificate pupils, are employed the advancement of each graduate will be evident. The school aims to keep in touch with its graduates wherever employed.

Several graduates are already in charge of important mills or hold lucrative positions at the head of departments requiring exact knowledge of specialties, and these successes are not confined to the day graduates. My attention was yesterday called to three evening graduates in one mill concern who were operatives, earning from \$9 to \$13 per week, when they entered the classes of 1901 and 1902. Two of them are now assistant superintendents in one of the most important and most successful mills, while the third has just received the superintendency of the largest yarn mill in the country—just starting up. From a neighboring and equally important mill corporation, a day graduate in designing who came to us from the high school, has been recently advanced to a \$4,000 place in a textile distributing house at a great commercial centre. There are numerous instances of like progress, though all cannot be expected to so rapidly reach positions of equal importance. When we consider how difficult it has been in the past to work up through the mills to such positions, how long the road, we should appreciate the value of scientific industrial education.

The demands from the mills and selling houses for graduates of the school is steadily increasing, and is most liberal from apparently the most prosperous concerns. We have been unable this fall to comply with all requests, having still on file five applications not filled after wide correspondence. Our graduates, even when filling minor positions, seem to have sufficient evidence that they are appreciated to induce them to remain where they are even when more important openings are offered, and are wise in so electing. It is needless to say that such a showing is very satisfactory to the management.

The importance of mathematics in dealing with mechanical questions which are presented in textile manufacture, cannot be over estimated. It was the opinion of President Walker that mathematics is a complete substitute for the dead languages in mental training.



It demands the same close hard study to master it, it makes for exactness in acquirement and reasoning, consecutive thinking, while at the same time it is utilized necessarily in all engineering. Ample provision is made, therefore, for this branch in the engineering department of the school.

Decorative art develops the artistic sense and inculcates the fundamental laws governing color and free hand drawing, trains the eye and hand for excellence in applied textile design as well as in other branches of decorative design.

Dyeing makes such a demand upon the science of chemistry as to have compelled the trustees to offer a course with an instruction staff up to the standard of the highest educational institutions.

Facilities for the acquirement of commercial languages were early provided. Spanish, German, and French are mainly preferred by our pupils, though we are prepared to include all others. Greek is taught as a dead language at the universities and in some instances perhaps in your higher public schools. It is in our own schedule as a very much alive, modern language. The late instructor in Greek at Harvard, Prof. Felton, testified to the shock it gave him in landing at Athens to hear even the little street boys talking Greek. We have some five thousand Greeks in Lowell mostly employed in textile manufacture.

I have said that at first the institution took the character of what had been known as a trade school for increasing the supply of the ordinary operatives. Such schools were abundantly supplied in Germany and there was some excuse therefor during the period of the extraordinary rise of industrialism when the supply of operatives was insufficient. But there is now there a growing sentiment that the mill and the shop is the better place to learn a trade. Education, whether at the public or technical school should be regarded as preparatory to such learning; it cannot make the experienced, skilled workman. The working people are coming to differentiate the trade school and the technical industrial school. The one increases the supply of wage earners, often with the effect if not the view to decrease the wage. The latter gives the operative the why of science for what by long patience he has learned to do, and thus equips him to meet and understand the increasing demands of growing industries.

With the address of President James M. Dodge of the American Society of Mechanical Engineers, at the annual meeting in December, 1903, was submitted a diagram showing the average results of the

three methods of industrial education. Beginning at the age of 16 at \$3 per week the increase in wage by the shop, Trade School, and Technical School methods was for five or six years approximately the same. The Trade School pupil reached \$15 per week at between 20 and 21 years of age, the technical pupil and the shop trained pupil did not reach this wage until 23. Thereafter the shop trained rose at 24 to \$15.80 and remained at that wage. The Trade School pupil continued to lead the technical school pupil, the former at 23 receiving \$18 per week, and the latter a like wage at 24. At 25 each received \$22 per week. There they separated, the Trade School pupil gaining slowly and apparently resting at 32 years at \$25 per week for life, at which age the technical school pupil was receiving \$43 and still rising.

This diagram unquestionably gives the Trade School pupil the advantage over the shop trained for a short period but it also shows the superior advantages of scientific technical training. It also affirms the axiom that "the best is the cheapest," and is eloquent testimony to the importance of thorough grounding in sciences and arts as applied in the industry which one elects for a career.

Of the class numbering 473 that entered this school last year for evening instruction, 176, or over one third chose engineering, the remainder being distributed to the five other courses. Of these latter, with the exception of those in design, the desire seemed to be mainly for instruction in the theory rather than to gain skill in the manipulation of machinery. What the wage earner apparently wants is to rise to better compensated positions, and those who come to the school have the wit to perceive that a broader scientific education than the daily operation of his frame or loom will give him is required for advancement in an industry where invention is so active as at present.

Those who seek leading positions in the textile industry are fortunate if they have the opportunity to take the entire general education course from the Kindergarten to the college inclusive, provided they do not continue too long at the latter or become absorbed in scholastic studies to the extent to dull their creative, initiative faculties. The university course makes for self respect, manliness, assurance, courage in the battle of life, broad views of life and business, and fortunate is he who is able to secure it. It will be noted, however, that the largest percentage of our day pupils are from high schools and what preparation you should give them is the query. In addition to the other branches common to most schools they should



have all the physics and mathematics you can find time to give them. It is more important to be thorough as far as you can go than to cover much ground superficially. You can vastly lighten the burden of the technical industrial school, which should not be required to again go over the ground the high school is supposed to cover.

The high school diploma is received generally by technical schools as sufficient for matriculation, and it should be conclusive evidence that the applicant has passed a satisfactory examination in the required branches up to the requirements of the curriculum, as I have no doubt it usually is. Whether the general educational courses can be shortened or not you are best able to judge.

It will be seen that this school differs in character and scope from the foreign textile school, especially the English school, in that while giving instruction in the operation of textile machinery it includes, as fundamental to such applied course, thorough instruction in the sciences and arts. In this respect it differs from any known textile school. The fact that the school has a larger number of pupils than all the other textile schools of the country combined, seems to indicate that the Trustees have intelligently interpreted the demand for industrial education in textile lines. This is further indicated by the constantly widening demand from manufacturers for graduates, and the progress our graduates are making in the industry.

I presume your attention is so strongly directed to the subject of industrial education because of the agitation for more general and liberal provision by the Commonwealth for such education. The possibility of such extension to the cities, towns and villages where textile manufacture is the leading industry was not overlooked, when as the pioneer in this field, this enterprise was planned. We had first to develop an American system of scientific textile education. With this once established, our graduates distributed over the state would be available for local instructors of evening textile schools. These schools at large centres, as the need became apparent, might develop into day schools. Thus the Lowell school would perform the functions of an industrial normal school. Such evening schools would be comparatively inexpensive as doubtless manufacturers would aid with equipment, etc., and the instructors being employed during the day in the mills and shops would not be solely dependent on evening employment for a livelihood. Possibly provision would be made for exceptionally bright pupils of such school to complete their education in the day classes of the Lowell school.

Such scientific technical industrial schools would fit into, be consecutive with your higher school courses in the physical sciences and English, as the college is consecutive to and continues your classic courses: while the Trade School following closely the so-called practical or rule of thumb methods of the mill would not.

Our courses in Decorative art embrace color, free hand drawing, historic ornament, the conventionalizing of nature forms, is preliminary to application to textile design but equally so to all branches of decoration—wall paper, interior decoration, lithography, ornamental metal work, etc.; and so the instruction given in the sciences and arts is applicable to the machinery and chemical processes of all industries. Therefore the curriculum of all local industrial schools should be substantially the same as to fundamentals. It would vary only in the application of the sciences and arts to the leading industries of the locality.

It will be for the authorities to determine the scope of the public school curriculum. I can conceive of a high school or academy giving full instruction in all branches of physics, the industrial school then becoming simply an applied school. But presumably you would confine these schools to elementary instruction in these branches. It matters not to schools of this class where you stop, so that as far as you go you are thorough. The technical school should not be required to provide the preparatory work the public school has undertaken to perform. We cannot therefore too strongly urge upon you that your schools should be thorough in physics, mathematics, and English, as far as they go.

Then in active life physique is of the first importance. Send us youths who by physical culture, athletics, etc., have prepared themselves for the strenuous life that success now demands. It costs about as much to make a tool of soft iron as one that has a cutting edge and an axe head may be well tempered but it will be useless with a rope handle.

The school is established to furnish to the textile industry the best sort of material. The management does not care to spend the money of the state, of the city, or of its friends to produce human "seconds." It enforces rigid supervision of the pupils, compelling constant attendance, satisfactory progress, or resignation. It is not a reform school for the incapable, unambitious, or the idle.

Shall the proposed industrial schools be public schools, or private schools aided with public moneys? They should either be controlled

by representatives of the leading local industries, or if entirely public, an advisory board made up of such representatives should be provided whose assent for graduation should be required after the candidate has passed the usual "faculty" examination.

My mind inclines strongly to public control of this class of school. Perhaps because of long familiarity with the details and results of public administration. The systems and methods of public accounting have steadily been perfected with the view to accuracy that will pass rigid inspection. Publicity is always kept in mind. Then there is a higher standard of public spirit and integrity in public life, or perhaps I should say a different one than in business life. The business man wishes to know how much he has made but prefers concealment as to others. He is in business for the money that is in it. On the other hand the citizen enters public life not for gain, but honor, prominence among and the respect of his fellow-men. He stands in his relation to his master or employer as a servant anxious to command the confidence and favor of the public he has sought to serve. For these reasons there is much to be said in favor of the control of educational as of many other public service institutions by the state. I am aware that just at this time there is a widespread impression of general corruption or unfaithfulness to trust in public life, but my opportunities have enabled me to know that it is wrong, and the sensational fiction that has created it has made no impression on my mind. It would be well if every dollar given for public service work by private contributors to educational, charitable, and humanitarian associations generally, had in the application and the spending to pass the thorough and conscientious inspection of Legislative Committees.

## FROM ABROAD

The following is translated from the Exposition Internationale de St. Louis, U. S. A., 1904. Section Francaise, Rapport du Groupe 56.—Paul Masse, Vice President de la Chambre de Commerce d'Amiens, and Francisque Bonnier, Member de la Chambre de Commerce de Vienna, Conseiller du Commerce Extérieur, Rapporteurs; and gives a fair idea of the position which the school holds in the minds of commercial France.

During the decade from 1890 to 1900 there was considerable attention given to the question of textile instruction, especially in

Massachusetts. In 1895 the manufacturers of this state obtained the passage of a law authorizing the establishment of textile schools in cities of 450,000 spindles or more. The law assured in all of these schools, the assistance of the state amounting to 125,000 francs, in the event of an equal grant from the municipalities. This law was applied at Lowell, Lawrence, Fall River and New Bedford.

The first school to be established in accordance with this law was the Lowell Textile School opened in January, 1897, and which we have already visited through the courtesy of Mr. William W. Crosby, the principal and Mr. Smith, administrator and benefactor of the school.

The school at Lowell includes the departments for cotton spinning, woolen spinning, worsted spinning, designing, chemistry and dyeing, weaving and a mechanical engineering department besides a course in the preparation of warps. Opportunities are given to the students for visiting during the school year the manufactories of New England.

The equipment of the department of woolen spinning includes two bowls for scouring with automatic feed, one dryer with automatic feed, a burr picker, a mixing picker, a set of cards for coarse and medium fibres, a set for finer fibres, two mules of 120 spindles and one twister of 20 spindles.

The department for the preparation of warps is composed of a beamer, a slasher, a dresser, a jack spooler of 48 bobbins besides a certain number of hand beamers and dressers.

The department for weaving has 42 power looms for the various fabrics besides 40 hand looms.

The department of printing is composed of one printing machine, a kier and an assortment of copper kettles for dyeing.

The departments of dyeing and finishing include a washer, a fuller, a dryer, a teasler gig, a brush of two cylinders, a machine for tentering and drying, a double shearer, a circular press, a sewing machine, a measuring machine, a mercerizing machine, a piece dyeing machine, a machine for the dyeing of the primary fibres (raw stock dyer), a machine to dye the skein (skein dyer).

If one is to add to this nomenclature, all the auxiliary machines, the equipment for worsted spinning, preparation of the cotton warps, the silk warps, the laboratories of chemistry and physics, and the chemistry museum, one sees that the Lowell Textile School is composed of an installation of the first order. It is the school of the world which includes the study of the greatest number of different textiles.



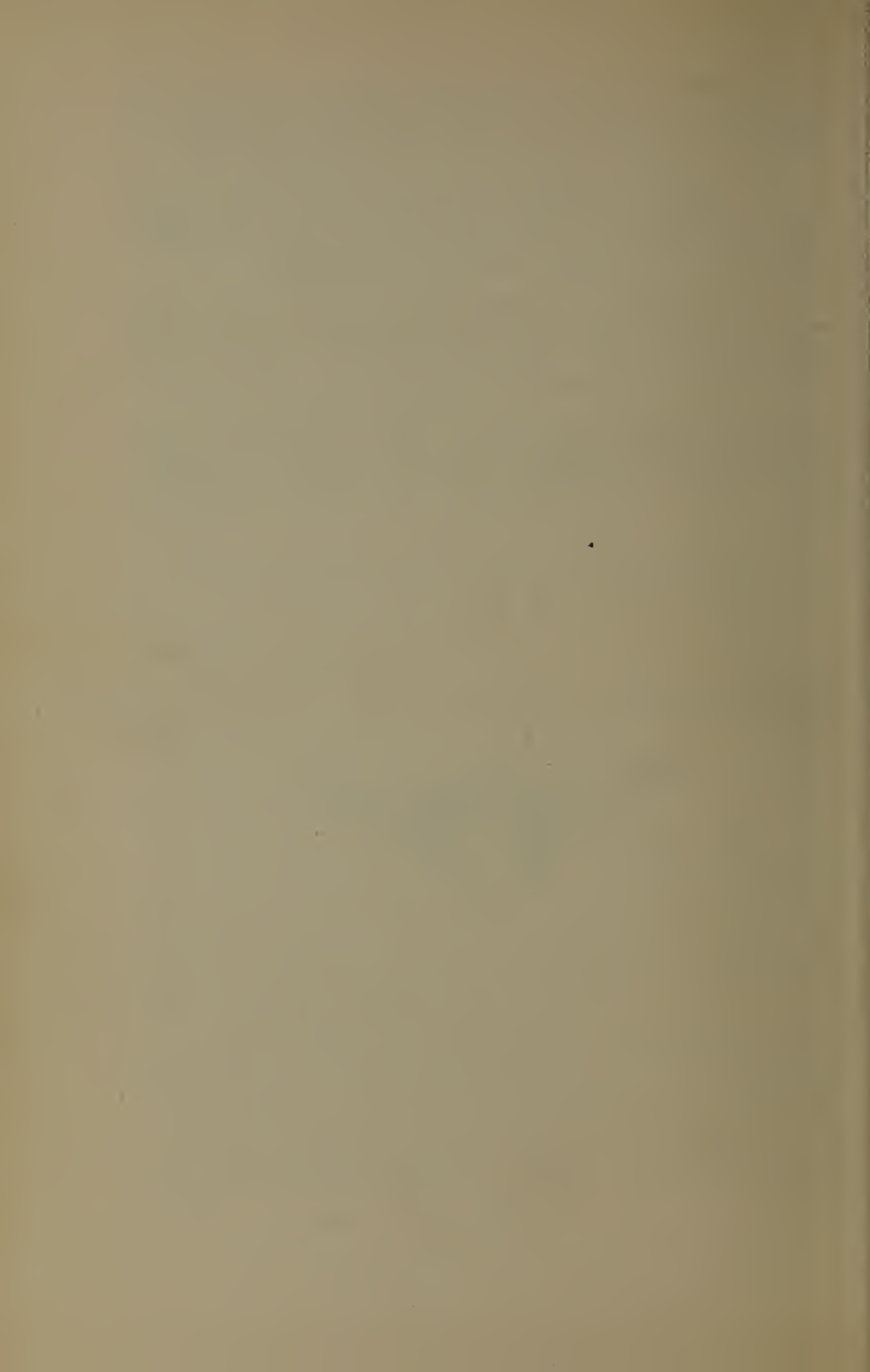
The establishment was preceded by inquiries concerning the organization and methods of similar foreign schools, especially the schools of England, France, Switzerland, Germany and Russia.

The value of the equipment of the Lowell Textile School is estimated at 550,000 francs, besides which there are more than 400,000 francs from donations. The value of the land occupied is 500,000 francs; that of the buildings more than 1,125,000 francs.

The participation of the state in the expenses has been more than 450,000 francs besides its annual appropriation which gives from 75,000 to 100,000 francs. One of the founders, Mr. Frederick Fanning Ayer, has alone given 500,000 francs.

.....the Lowell Textile School gives instruction in the evening, intended to offer to operatives occupied during the day, the acquisition, in several winters, of a complete technical instruction without interruption to their daily professional duties.







# BULLETIN

OF THE

## Lowell Textile School

Lowell, Massachusetts, U. S. A.



ISSUED QUARTERLY

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Entered Aug. 26, 1902, at Lowell, Massachusetts  
as second-class matter under Act of  
Congress, July 16, 1894

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Moody Street and Colonial Avenue

FOR BULLETIN AND TERMS ADDRESS CHAS. H. EAMES, SECRETARY.

## The Proper Sequence

With the approach of Commencement Day the graduate of the High School or Academy is asking the question, "Shall I continue my education for three or four years or shall I go to work?" Some who have chosen the first alternative are debating between college and technical school. Probably some have decided this question a year or two before the date of graduation and have, assisted by the advice of their parents or friends, considered the relative advantages of both. In many cases the parents decide for the son and where the financial circumstances are meagre and every expense must be considered, or where the parent has sufficient influence to place his son in a desirable position, the problem of the advisability of first sending the son to school and then finding a position for him, or allowing him first to work in some minor position of his chosen field in order to better appreciate the theoretical training to be taken up later, presents itself for definite decision. Out of this question have grown two theories regarding the proper sequence of training for a young man who contemplates an engineering, mill or shop career. The first advocates several years of practical experience that the apprentice may appreciate the problems in the commercial world and at once recognize the application of some fundamental principal when studied later in school. The second is the converse of the first. It is the plan usually followed in this country and is supported by the best students and writers of educational methods. In general, England supports the first theory, while Germany and America are advocates of the second.

The "Electrical World and Engineer" in a recent issue has commented upon a report of Prof. W. Ripper to the Association of Technical Institutions upon the subject, "On the Best Method of Arranging the Period of College and Workshop Training for Technical Day Students," and believing that the criticism of the report has value to all young men considering a technical career, we reprint it with the consent of the above mentioned publishers.

Following this is given a paper upon "Student's English" written by Wm. W. Crosby, late principal of this school. This was read at the meeting of "New England Association of School Superintendents" held in Southwick Hall, Lowell, Mass., Nov. 10, 1905. As it aroused considerable interest at that time we believe it will be appreciated by those who attended the meeting and wish the paper for further consideration as well as by those who were unable to hear the paper.

## Technical Education in Great Britain

"The present status of technical education in Great Britain is illustrated in a report on the subject by Prof. W. Ripper, of the Technical Department of the Sheffield University, recently made at the annual meeting of the Association of Technical Institutions. It appears that British employers, as a rule, have no use for the technical graduate, and Prof. Ripper states that he knows of students who, when applying for an appointment, have feared to mention that they had been trained in a technical institution. Formerly a similar condition existed in this country, but fortunately was uprooted half a generation ago. Doubtless the inchoate condition of technical educational methods in Great Britain is largely responsible for the position of employers. While technical schools, so-called, are not lacking, their number being more than 100, it is astonishing to find that the faculty in the majority of these schools consists of only four members or less.

The clue to the present unsatisfactory condition appears to be given in the report of Prof. Ripper, the title of which is "On the Best Method of Arranging the Period of College and Workshop Training for Technical Day Students." This discusses the question whether the student should enter the workshop first, and afterwards proceed to the technical college; whether he should enter the technical college direct from school, and after his course proceed to the works; or whether he should follow the works training and college training concurrently, by alternating attendance of six summer months in the works and six winter months at the college. It would thus appear that the methods of technical training which were discarded a score or more years ago in this country and in Germany still hold full sway in Great Britain.

In support of its conclusions, the report lays down the principle that the principal qualities required of a successful engineer are the qualities acquired in the workshop, the qualities acquired as a student being of secondary importance to the practical. In striking contrast is the broad American and German view, that the function of the technical school is to train the mental faculties and impart the great body of scientific and technical principles upon which a given branch of engineering reposes; and that the educational period should precede the period of application, and not be curtailed by an intermixture of practical work apt to be of little or no value to the graduate starting on his work-a-day career. Early experience in technical education in this country taught that

whether a graduate had a maximum or minimum of practical instruction during his college career, he had to begin at the bottom of the ladder upon graduation ; that but a small fraction of his school-day practical training applied directly to any particular line of work in which he might after graduation enter, and even this fraction would partly or wholly have to be unlearned as not in accordance with the practice of his employer ; in short, that under any educational circumstances the graduate was accepted only as raw material and that a period of apprenticeship of several years in direct contact with practical work was necessary for his adjustment to the particular industrial conditions of his field of work, and for the attainment of the balanced judgment which is the most essential qualification of the engineer.

The report does not discuss technical education in any of its broader aspects, and concludes that each of the three systems above noted has its advantages as follows :

1. The student who has been in the works first brings to his college work a knowledge of practical facts which enable him to appreciate to the full the value of his technical lectures. Many of the points raised in the technical lectures are of little meaning or interest to the student who has never previously been in the works.

2. The youth is generally much more certain of his college training if he takes it before entering the works, than if he postpones the college training till he has been through the works, as there are often many inducements held out to him not to break away from his connection with the works. The student who enters the workshop first finds on returning to the college that he has lost much of the information acquired during his school training, particularly his skill in mathematics, and also the habit of study, and has to spend much time in regaining lost ground.

3. Prof. Ripper says he has had some experience with the system whereby there is attendance at the works and college concurrently, and is satisfied that it is a very good one. The opinion of his best students who have passed under this system is of strong approval and high appreciation of it, as a means of preparation, both practical and theoretical for their future career.

What Great Britain appears to lack is a militant educator who will have the courage to expose the pitiful inadequacy of British technical educational methods for the needs of the present age, and who will, day in and day out, advocate before the public the modern methods which have been such a large factor in transferring to the United States and Germany the industrial ascendancy formerly held by Great Britain."



## Student's English

If I could have accepted the kind invitation to speak to your Association, I am sure I should not have allowed the opportunity to pass without referring to the matter informally discussed when some of you were at Lowell in the spring. At that time the question was asked, "How well prepared are the members of the entering class, who come directly from the High Schools, and what can the Superintendents' Association do to help the work of Industrial Education in general and the Textile Schools in particular?" Although the question was asked and the answer given on the spur of the moment, it does not seem upon reflection but that the position taken was tenable.

The answer in brief was that the greatest general difficulty was in the use of the English language, and that whatever the Association might do to help along this line would be very acceptable.

It is a fact that many students are thoroughly well equipped in the mathematics, can read one or two foreign languages with some ease, are able to describe the great battles of the world, in the language of others, and, in fact, pass well in general society, yet often fail when put to the test of describing a definite happening in such language as to be accurate, clear and concise.

Just how far the preparatory schools can or should go in dealing with this question is not for me to discuss, for it has been my lot to deal with the fact that there is a decided lack of ability to use the English language with facility, and I am sure that with this deficiency supplied a most decided increase in the efficiency of the advanced and professional schools would be secured. You gentlemen are right in touch with the machinery, which, in proper adjustment, controls the results of the whole fabric of higher education and, ultimately, the prosperity of our country.

The importance of character building cannot be lost sight of for one moment, for without this element, the whole structure of our school development would collapse. But a sound body may be a giant in strength, yet unruled by the mysterious agency of the mind, as a ship without its helm, dismal failure and disaster follow. So there must be the training along with the character building, and our own splendid school system, known and praised the world over, has combined the two elements with wonderful success.

It is evident even to the layman, that a boy who expects to go

into any enterprise in which there are engineering details, must know arithmetic, algebra, geometry, physics, chemistry, etc., and quite truly, but I have seen all these subjects under good control and then poor results attained because of a lack of efficiency in the means of intercommunication and interchange of thoughts and ideas.

An ordinary workman is taught to run a machine, or to perform some particular operation, by watching another for so long a time that he fairly absorbs the details in spite of himself. Even complicated processes can be taught and learned in this way, but in the time taken, not many different ones can be mastered ; the individual is therefore condemned to a very limited field. In any position with breadth of outlook and opportunity, there must be recourse to question and answer, and it is a matter of experience that a student seldom if ever obtains the proper grasp of a subject, even though in the case of mechanical operations, he can perform the operations themselves well, until he can describe clearly both his machine and its manipulation. Very often the failure to put the description into suitable language is a result of an imperfect understanding of the technicalities, but more often the trouble is with the use of the language itself. I have found many cases where the operation of a machine was understood sufficiently well by the student, so that he could perform it satisfactorily ; where the names of the parts or processes involved were well comprehended ; where there was an instructor present who would supply the names of parts to any student who requested it ; where, in general, the class had spent a sufficient time with a machine and process to be entirely familiar with the details, and where the constants, to borrow a mathematical term, were available, and yet many of the class were unable to put on paper a description that was at all acceptable. In fact, many individuals seemed to have no conception of how to start. It was very interesting to note the increased facility with which these same students handled similar problems later on when they had practiced.

The function of our technical or professional schools is not to teach English, and yet their efficiency is largely dependent upon the facility with which English is used as a vehicle of thought. Surely, this subject is the one above all others which can be commenced early, and given in such homeopathic doses, as not to strain the tender tissues of the young brain, and it is to be hoped that all effort possible will be made to meet the demand.

Poetical fancy, aestheticism, ideals and the like may and should have their place, but there come times in all experiences, when



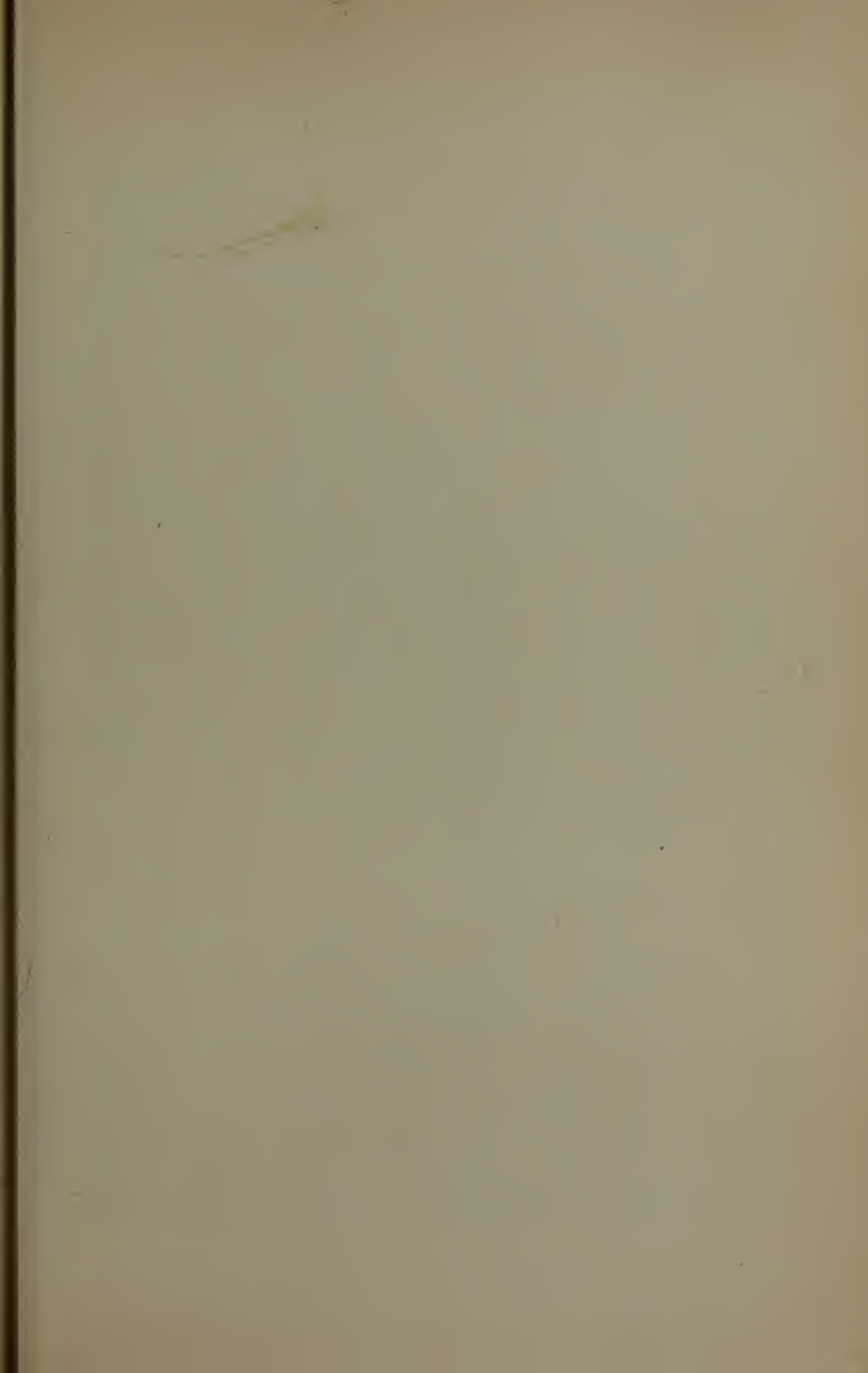
exact descriptions are necessary; often the comfort, the health or the wealth may depend upon such a description, and to be in command of this power is of great value to the possessor.

The observations which have prompted these suggestions have been from actual experience, while the writer had the honor to be Principal of the Lowell Textile School, and are not confined to any one section of a single district, but are perfectly general. It may be that too much is expected, yet on the other hand, high efficiency is attained only by noting the defects and applying the remedy to each deviation. It is the belief of the writer that there is room for improvement and that your Association can do much to help this work along. It is not quite fair to charge the preparatory schools with all the shortcomings of the community just because the law gives them the children to train. That would be too much, for we know well that certain reformations ought to have been commenced several generations back. But at least, this may be made the beginning of the reformation of generations as yet unborn.

In the every day affairs of life, and particularly in business, we see much time lost in explaining away misunderstandings arising largely in the different constructions placed upon loosely worded descriptions or directions. It is a bad state of affairs when people deliberately twist and distort meanings, but it is in many ways worse when the reader, in serious earnestness, is unable to ascertain the meaning which is intended.

What the details of the remedy would be, or how they should be applied, is in your hands. I do not suppose for a moment that these suggestions are original with myself, but I offer them in all seriousness, after actual contact with the situation. It is my hope that the coming generation may be so instructed and developed that, without special effort, it may be able to use clear, clean-cut, concise constructions.







SOUTHWICK HALL.

FALMOUTH STREET BUILDING

May, 1906

BULLETIN

OF THE

Lowell Textile School

LOWELL, MASS.

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*Issued Quarterly*

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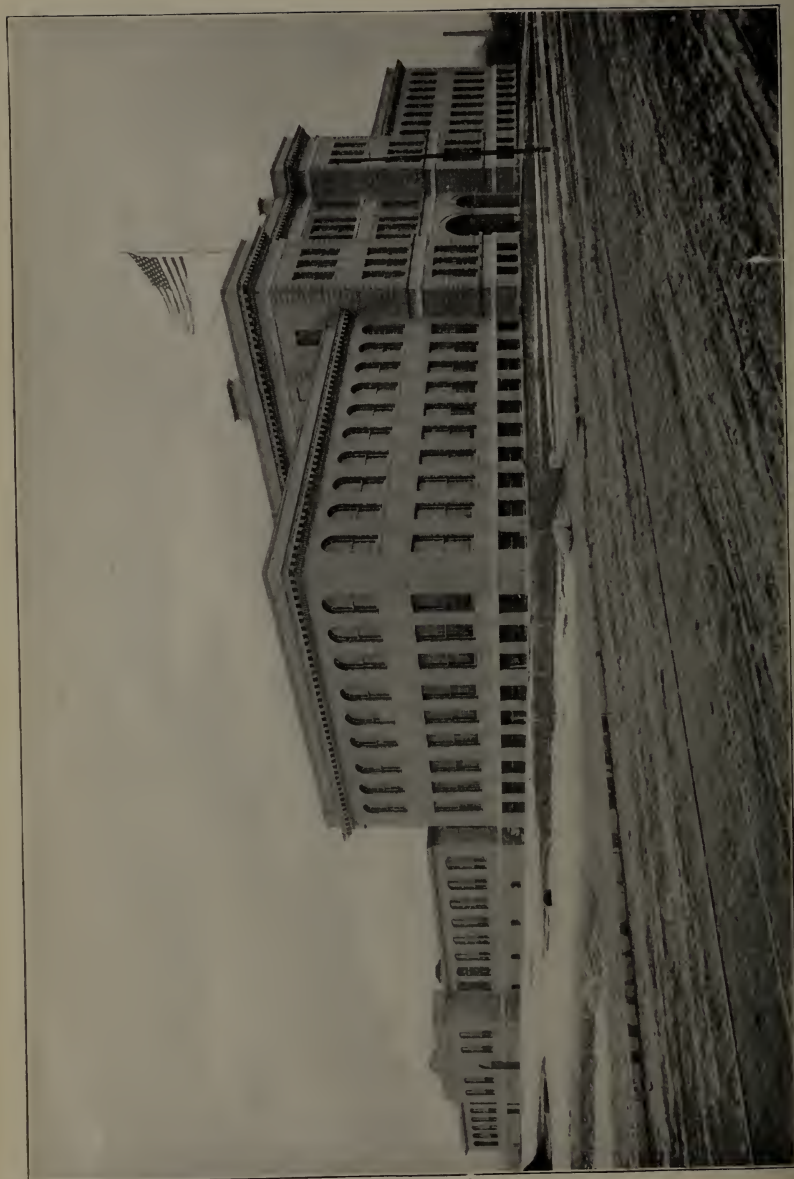
1906-1907

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Entered August 26, 1902, at Lowell, Mass., as second class matter,  
under Act of Congress of July 16, 1894.

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*Moody Street and Colonial Avenue*



KITSON HALL.

SOUTHWICK HALL.



## ADDENDA

### Additional Trustees Elected by Alumni Under Act of 1905

For Four Years, from July 1, 1906:

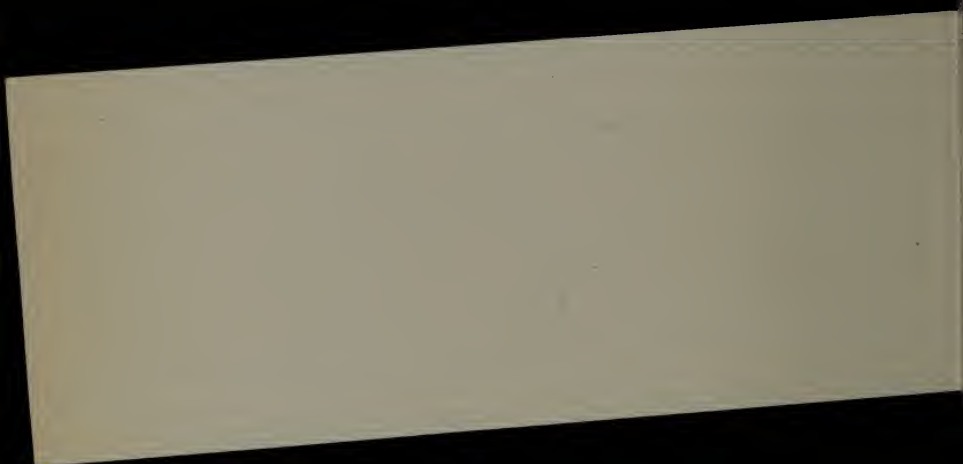
ROYAL P. WHITE, Class of 1904, Superintendent Stirling Mills, Lowell, Mass.

For Three Years from July 1, 1906.

WILLIAM R. MOORHOUSE, Class of 1901, Color Chemist, Cassella Color Co., Boston, Mass.

For Two Years from July 1, 1906.

JAMES F. SYME, Class of 1900, Agent Ray Mills, Franklin, Mass.



# Trustees of the Lowell Textile School

(Incorporated 1895)

Honorary Trustee

FREDERICK FANNING AYER

New York City

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Officers, 1906

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A. S. COVEL, Boston, 1908  
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Treasurer Arlington Mills

On the part of the City of Lowell

#### *Ex-Officiis*

HON. JAMES B. CASEY  
Mayor of Lowell

A. K. WHITCOMB  
Superintendent of Public Schools

JAMES F. WALKER  
Chairman Board of Aldermen

HARRY H. B. READ  
President Common Council

By appointment of the Lowell Textile Council

MICHAEL DUGGAN 1906

### Permanent Trustees

ALEXANDER G. CUMNOCK, Lowell, Treasurer Appleton Company  
CHARLES L. HILDRETH, Lowell, late Superintendent Lowell Machine Shop  
EUGENE S. HYLAN, Lowell, late Treasurer New England Bunting Company  
ARTHUR G. POLLARD, Lowell, President Lowell Hosiery Company  
JACOB ROGERS, Lowell, Banker  
FREDERIC S. CLARK, Boston and North Billerica, Treasurer Talbot Mills  
ALVIN S. LYON, Lawrence, Agent Wood Worsted Company  
HON. FREDERICK LAWTON, Lowell, Justice Superior Court  
THOMAS WALSH, Lowell, Superintendent Hamilton Print Works  
HAVEN C. PERHAM, Lowell, Treasurer Kitson Machine Shop  
JAMES T. SMITH, Lowell, Attorney-at-Law  
WALTER E. PARKER, Lawrence, Agent Pacific Mills  
J. W. C. PICKERING, Lowell, President Pickering Manufacturing Company  
WM. M. WOOD, Andover, President American Woolen Company  
GEORGE E. KUNHARDT, Lawrence and New York, Woolen Manufacturer  
FRANK E. DUNBAR, Lowell, Attorney-at-Law, and President Appleton Company  
JOSEPH L. CHALIFOUX, Lowell, Merchant  
FRANKLIN NOURSE, Lowell, Agent Lawrence Manufacturing Company  
CHARLES H. HUTCHINS, Worcester, President Crompton & Knowles Loom Works  
FREDERICK A. FLATHER, Lowell, Treasurer Boott Mills

### Additional Trustees Elected by Alumni Under Act of 1905

For Two Years, from July 1, 1905:

HENRY A. BODWELL, Class of 1900, Assistant Superintendent Smith & Dove Manufacturing Company, Andover, Mass.

For One Year; from July 1, 1905:

PAUL T. WISE, Class of 1901, Superintendent Brookside Mills, West Chelmsford, Mass.



## General Committees

### *FINANCE*

A. G. CUMNOCK, Chairman      A. G. POLLARD      ALVIN S. LYON

### *BUILDING AND LEGISLATIVE*

A. G. CUMNOCK, Chairman      A. S. COVEL      FRANKLIN W. HOBBS  
FREDERIC S. CLARK      ALVIN S. LYON      JACOB ROGERS  
FRANK E. DUNBAR      A. G. POLLARD      JAMES T. SMITH

### *WAYS AND MEANS*

JAMES T. SMITH, Chairman      A. S. COVEL      FRANKLIN W. HOBBS  
FREDERIC S. CLARK      WALTER E. PARKER

### *DEPARTMENT COMMITTEES*

#### *Cotton Spinning*

FRANKLIN NOURSE, Chairman      CHARLES L. HILDRETH

#### *Woolen and Worsted Spinning*

FRANKLIN W. HOBBS, Chairman      FREDERICK A. FLATHER

#### *Weaving*

ALVIN S. LYON, Chairman      WALTER E. PARKER

#### *Chemistry and Dyeing*

THOMAS WALSH, Chairman      FREDERIC S. CLARK

#### *Decorative Art*

JAMES T. SMITH, Chairman      FREDERICK LAWTON

#### *Designing and Finishing*

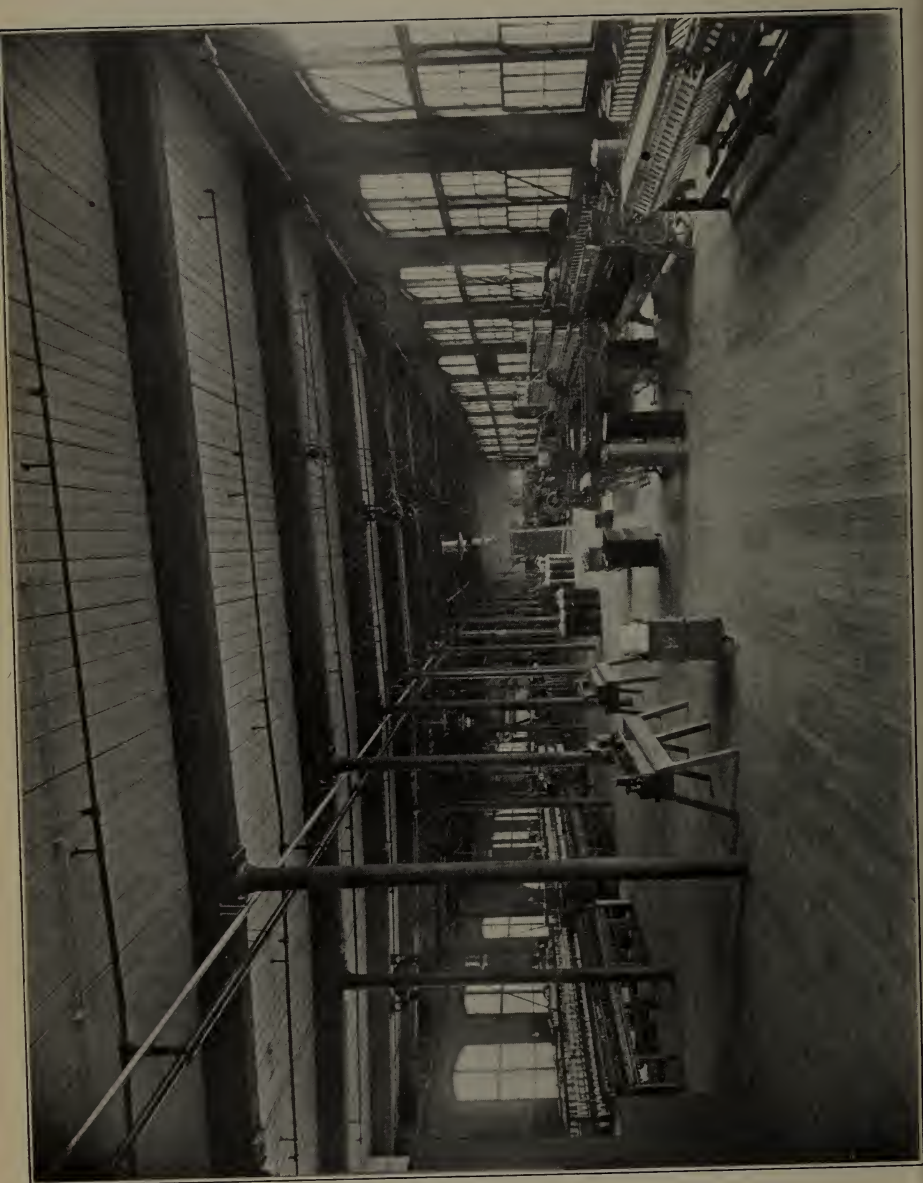
FREDERIC S. CLARK, Chairman      GEORGE E. KUNHARDT

#### *Mechanical and Electrical Engineering*

HAVEN C. PERHAM, Chairman      HENRY A. BODWELL

#### *Athletics*

JAMES T. SMITH, Chairman  
FRANK E. DUNBAR      JOSEPH L. CHALIFOUX





# Administration

CHARLES H. EAMES, S. B. Secretary of the School

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## Officers of Instruction

FENWICK UMPLEBY,  
Professor of Textile Design and Fabric Structure

LOUIS A. OLNEY, A. C.  
Professor of Chemistry and Dyeing

WILLIAM NELSON,  
Head Instructor in Warp Preparation and  
Weaving

EDGAR H. BARKER,  
Head Instructor in Woolen and Worsted Spinning

STEPHEN E. SMITH,  
Head Instructor in Cotton Spinning

GEORGE H. PERKINS, S. B.  
Head Instructor in Mechanical Engineering

ARTHUR A. STEWART,  
Head Instructor in Finishing

G. CARL SPENCER, S. B.  
Instructor in Chemistry

ARTHUR F. FERGUSON,  
Instructor in Textile Design

ARTHUR L. WILLEY,  
Instructor in Cotton Spinning and Knitting

JOSEPH WILMOT,  
Instructor in Power Weaving

HERBERT F. SCHWARZ,  
Instructor in Dyeing

JOHN B. REED, A. B.  
Instructor in Chemistry

IDA A. WOODIES,  
Instructor in Free Hand Drawing and  
Decorative Art

GEORGE E. MARSH, S. B.  
Instructor in Electricity, Physics and Mathematics



## Officers of Instruction—Continued

RUSSELL W. HOOK,  
Instructor in Dyeing

JOHN N. HOWKER,  
Instructor in Wool Sorting and Scouring

HENRY B. ARUNDALE,  
Instructor in Woolen and Worsted Spinning

STEWART MACKAY,  
Instructor in Hand Loom Department

PAUL E. KUNZER, PH. D.  
Instructor in Modern Languages

## Faculty

C. H. EAMES

E. H. BARKER

FENWICK UMPLEBY

G. H. PERKINS

L. A. OLNEY

S. E. SMITH

WILLIAM NELSON

ARTHUR STEWART

# Calendar for 1906-1907

1906

1907

JULY						
S	M	T	W	T	F	S
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	31				

AUGUST						
S	M	T	W	T	F	S
			1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	31	

SEPTEMBER						
S	M	T	W	T	F	S
						1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
$\frac{23}{30}$	24	25	26	27	28	29

OCTOBER						
S	M	T	W	T	F	S
	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30	31			

NOVEMBER						
S	M	T	W	T	F	S
				1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	

DECEMBER						
S	M	T	W	T	F	S
						1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
$\frac{23}{30}$	$\frac{24}{31}$	25	26	27	28	29

JANUARY						
S	M	T	W	T	F	S
		1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30	31		

FEBRUARY						
S	M	T	W	T	F	S
					1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28		

MARCH						
S	M	T	W	T	F	S
					1	2
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10	11	12	13	14	15	16
17	18	19	20	21	22	23
$\frac{24}{31}$	25	26	27	28	29	30

APRIL						
S	M	T	W	T	F	S
	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30				

MAY						
S	M	T	W	T	F	S
			1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	31	

JUNE						
S	M	T	W	T	F	S
						1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
$\frac{23}{30}$	$\frac{24}{31}$	25	26	27	28	29

# CALENDAR

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## 1906

First entrance examinations Friday, June 1, at 10 a. m.

Second entrance examinations Thursday, June 14, at 10 a. m.

Entrance examinations for day students, Thursday, Sept. 13, at 10 a. m.

Examinations for advanced standing, Monday, Sept. 17, at 10 a. m.

Entrance examinations for evening students, Thursday, Sept. 20, at 7 p. m.

( For additional examinations for evening classes, see announcement. )

Day school year begins Tuesday, Sept. 25.

Evening school year begins Monday, October 15.

Thanksgiving recess, Thursday, Nov. 29 to Saturday, Dec. 1, inclusive.

Christmas recess, Saturday, Dec. 22, to Wednesday, Jan. 2, 1907, inclusive.

## 1907

Semi-annual examinations begin Wednesday, January 23.

Second term begins Monday, Feb. 4.

Annual examinations begin Tuesday, May 21.

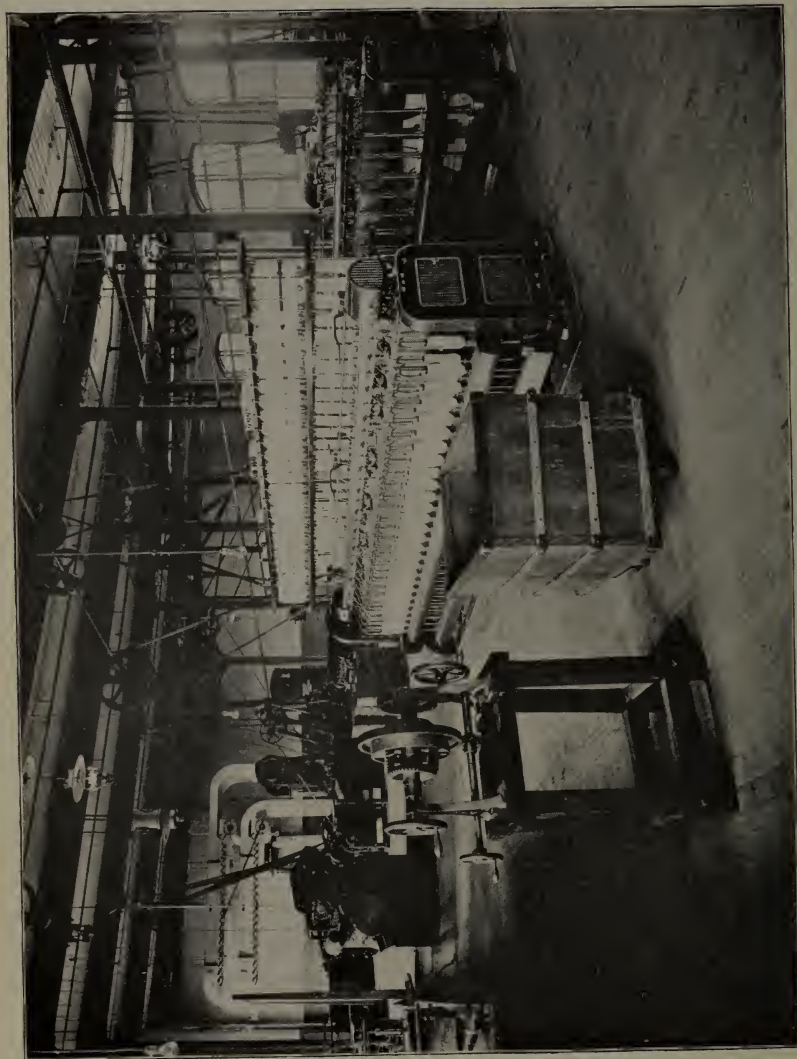
Diplomas awarded Thursday, June 6.

First entrance examinations Monday, June 17, at 10 a. m.

Second entrance examinations Monday, June 24, at 10 a. m.

There will be no sessions of the school on Washington's birthday or on Patriots' Day.





COTTON YARN DEPARTMENT  
FLY FRAMES



# The Lowell Textile School

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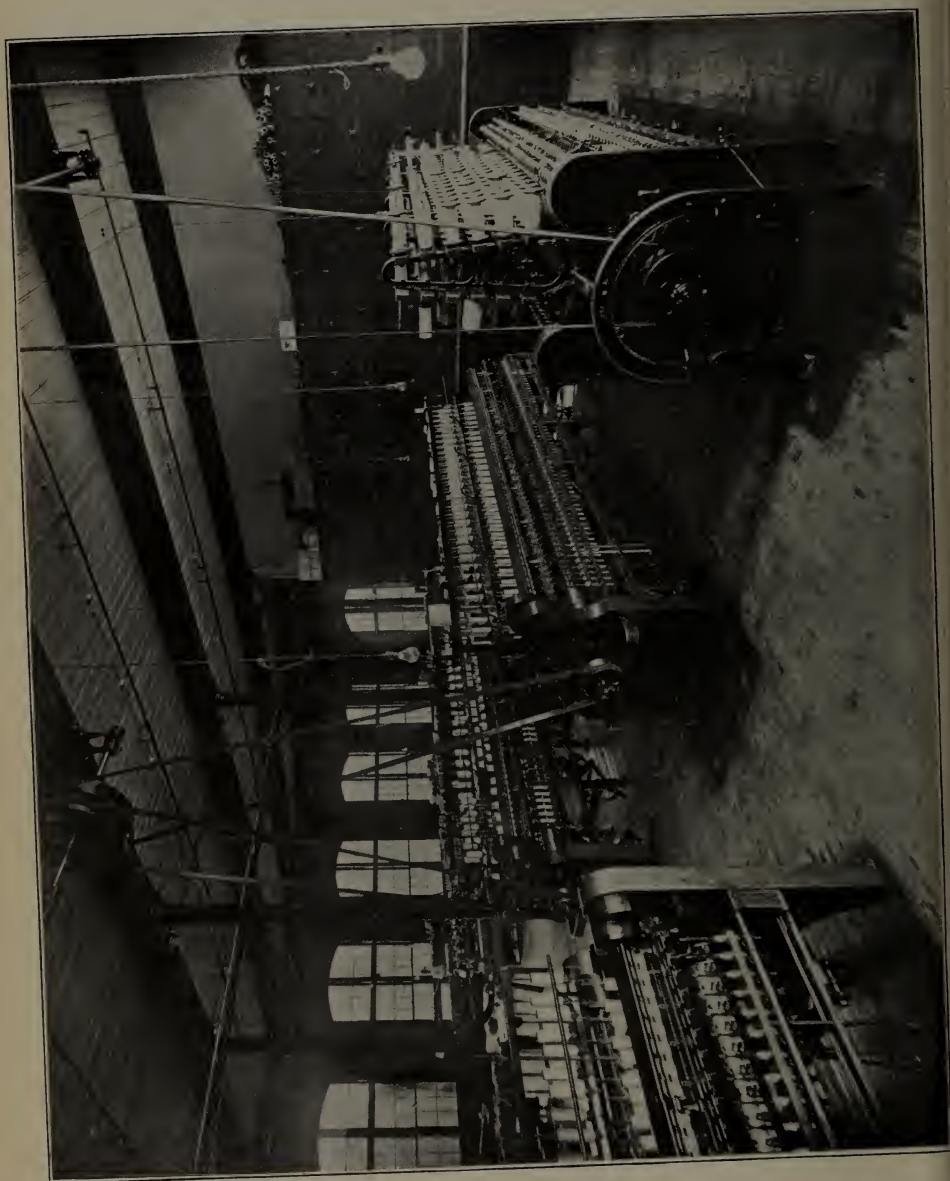
The Lowell Textile School was established, and is managed, by the Trustees of the Lowell Textile School of Lowell, Massachusetts, "for the purpose of instruction in the theory and practical art of textile and kindred branches of industry," as set forth in the act of incorporation.

The movement for the establishment of the School dates from June 1, 1891, but it was not opened for instruction until February 1, 1897.

Not only did the normal progress of the textile industry require such a school, but through the rapid development of the manufacture of the coarser cotton fabrics in the southern states, a crisis had arrived in the leading industry of New England which could only be met by wider and more thorough application of the sciences and arts for the production of finer and more varied fabrics.

Modeled on the lines of the departments of the Massachusetts Institute of Technology, among which is not included textiles, it is now prepared to give thorough instruction in the elements and principles of the sciences and arts applicable to textile and kindred industries and also in their application to the manufacture of all varieties of textile fabrics.

In industrial education the distinction between Trade and Technical Industrial Schools is coming to be understood. The Lowell School belongs to the latter class. Beginning with limited equipment, instruction staff, and means, instruction at first was by Mill or Trade school methods—the pupil was brought directly to the machine, its parts explained to him, and its operation in manufacturing. The curriculum was, however, rapidly extended, department after department opened and equipped, and commodious and well adapted buildings provided for a permanent home.



While the progress of invention and the demands of ever changing markets will compel constant improvement in methods and additions to the very extensive equipment, with this catalogue substantially closes the period of establishment with all departments open for instruction in all branches of the textile art under an extensive and able corps of instructors and assistant instructors.

Of the incorporators the permanent trustees (limited to twenty) are mainly representatives, as president, treasurer, agent, or superintendent, of the management of great textile or textile machine corporations of the Commonwealth, and associated with them are, ex-officiis, His Honor, the Lieutenant Governor and the Secretary of the State Board of Education, and two trustees appointed for four-year terms by the Governor and Council. Also the Mayor, Superintendent of Schools, the presiding officers of the two branches of the City Council, and a representative of the textile council of the city of Lowell. Last year (1905) the Legislature authorized the graduates of the school to elect two additional trustees, and by an act of this year the number is increased to four for four-year terms.

By the terms of the by-laws at least three-fourths of the permanent trustees must be persons "actually engaged in or connected with textile or kindred manufactures."

Lowell, Massachusetts, is called the "Mother Textile City of America," and in locating the school at this center a considerable advantage is maintained for the reason that every commercial fibre enters into the products of the great Merrimack Valley Textile district. The practical work of the school is therefore kept closely in touch with the several branches of the industry which are included in the courses of study.

His Excellency, Governor Roger Wolcott, formally opened the school on January 30, 1897, there being present a large and representative gathering of gentlemen from the textile industries in all portions of New England. The regular classes of the school were opened on February 1, 1897, and have been regularly conducted since that time.



WOOLEN AND WORSTED YARN DEPARTMENT



His Excellency, Governor John L. Bates, dedicated the buildings forming the permanent home of the school on February 12, 1903, in the presence of a large number of guests representing the Legislature as well as the educational, textile, commercial interests of the Commonwealth.

It is found as time goes on that the graduates of the school must be equipped more thoroughly, and it now seems advisable that all students should enter the Lowell Textile School with a preparatory training which is the equivalent of that afforded by the regular four-year course of a standard high school. Even in such cases it is necessary to include in the curriculum of this school the branches of General Chemistry, Decorative Art, and Mechanics. These subjects must be taught in a most thorough manner, for upon them depends all the future knowledge pertaining to the great textile industries. It is not the object of the school to train these graduates for professional and scientific work but the principles of science and art are taught with the particular view to their application in industrial and commercial problems. There are many courses, however, which are interesting and profitable to graduates of universities and scientific institutions, and special facilities are offered to those who wish to take up special work at this school.

The mechanical equipment of the school includes the best makes of textile machinery and these machines, while built as they would be for regular work, are, so far as possible adapted to the experimental work which is of particular value in such an institution as this.

There is a more varied equipment in this school than in any other, either in America or Europe, and it is now possible to convert the raw stock into the finished fabric, within the school.

The growth of the schools has been constant, as is evident from the fact that when it was opened February 1, 1897, there were 32 day and 110 evening pupils. January 1, 1906, the roster showed 146 day pupils and 420 evening pupils.



WORSTED COMB



On January 1st, 1903, the School was transferred from the rented quarters that it had occupied for five years, to the site and buildings where it is permanently located.

The site is a commanding one, consisting of ten acres at a high elevation, on the west bank of the Merrimack River, extending to and overlooking the rapids of Pawtucket Falls, the first to be utilized for power weaving in America on an extensive scale. The site was contributed by Frederick Fanning Ayer, Esq., of New York City, and the Proprietors of the Locks and Canals on the Merrimack River. The buildings consist of Southwick Hall, Kitson Hall and one on Falmouth Street not yet named.

Southwick Hall includes a central mass 90 x 90 ft. having three stories and two wings 80 x 85 ft. with two stories and a well-lighted basement. The building is pierced in the centre by an arched way from which access is had to the wings and to the central courtyard.

Kitson Hall makes a right angle with Southwick Hall and is 60 x 252 ft. with one story and a basement. It is occupied by the Cotton Yarn Department and heating, lighting, ventilating and power plant.

Falmouth Street building forms the third side of the quadrangle and consists of two portions, one 75 x 130 ft., two stories, and the head house 70 x 80 ft., three stories and basement. This building is occupied by the departments of weaving and wool yarns. The head house provides for an extension of these departments, for wool scouring, carbonizing, conditioning, etc., and for knitting.

The buildings are all faced with light brick with granite and Indiana lime stone trimmings and are of modern mill construction adapted to educational uses. The floor space of the School is quadrupled in the new home, permitting of a very large increase in equipment and is now occupied by the several departments as follows:

Cotton Spinning .....	14,000	sq. ft.
Woolen and Worsted Spinning .....	20,700	" "
Decorative Art and Textile Design .....	14,000	" "



General Chemistry and Dyeing Laboratories..	14,000	sq. ft.
Dye House .....	6,000	" "
Finishing Room .....	5,000	" "
Power Weaving .....	15,600	" "
Knitting .....	5,600	" "
Mechanical and Electrical Engineering .....	8,600	" "

Southwick Hall was contributed by the Commonwealth of Massachusetts and Frederick Fanning Ayer, Esquire, of New York City, and is a memorial to Royal Southwick, a leading textile manufacturer, a public man of earlier days, and a maternal ancestor of Mr. Ayer.

Kitson Hall, dedicated to the memory of Richard Kitson, was contributed by Charlotte P. Kitson and Emma K. Stott, his daughters; the Kitson Machine Company of Lowell, founded by him, was also a generous contributor.

### Day Classes

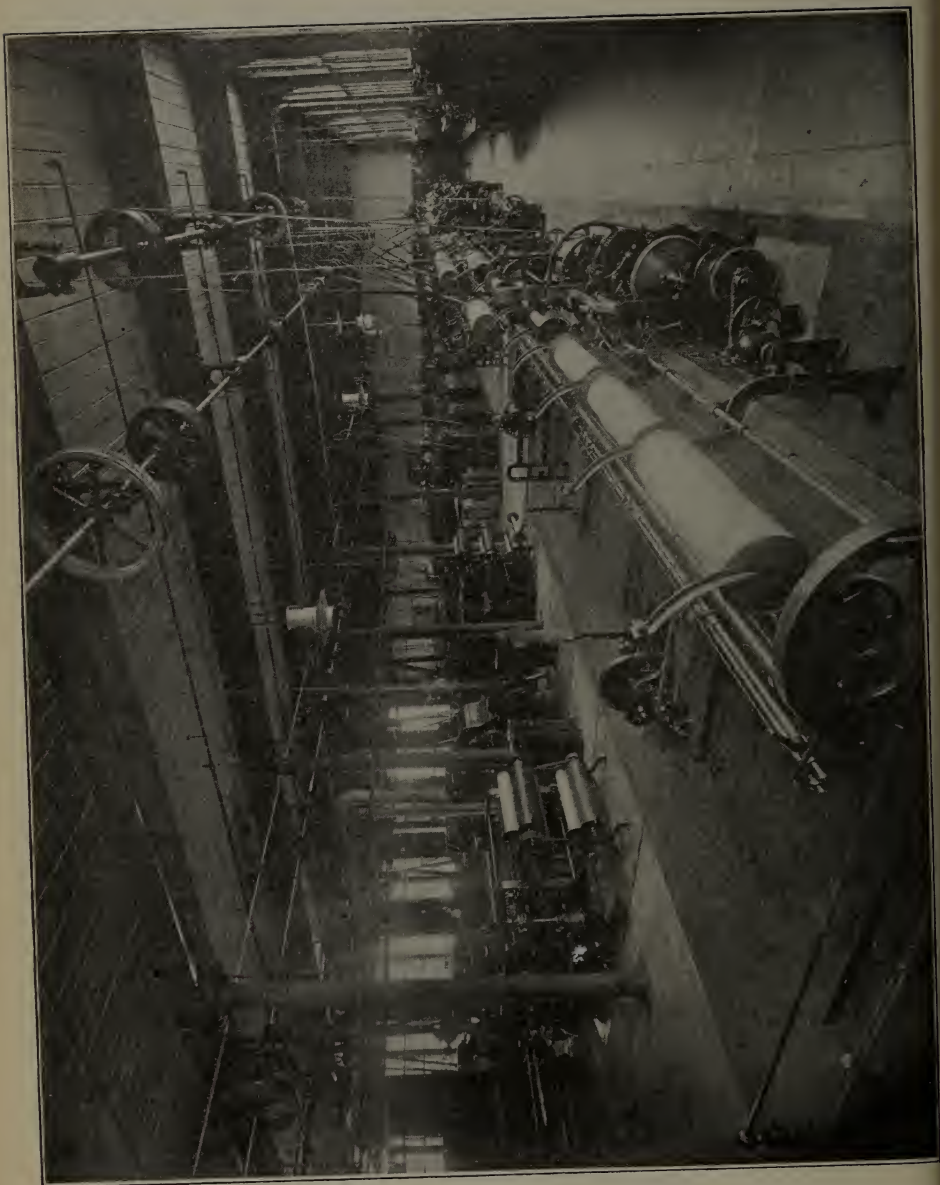
These are especially intended for the instruction of those whose intention it is to enter the business of textile manufacturing in any branch. The courses are sufficiently complete to enable one to start without any previous acquaintance with textiles; but at the same time those who have been engaged in such business and wish to improve their knowledge and experience, can devote their entire time to study most profitably.

Each course covers a period of three years, at the end of which time the regular diploma of the school is awarded.

There is one term of preliminary instruction, which is common to all courses. At the end of this term, each student is required to select which of the courses he is to follow in his subsequent studies, and the instruction to be given after the first term of the first year is specialized to suit each course.

The five regular diploma courses are:

- I. Cotton Manufacturing.
- II. Wool Manufacturing.
- III. Designing. General Course.
- IV. Chemistry and Dyeing.
- VI. Textile Engineering.





## Evening Classes

It is intended to give evening instruction to those who are engaged during the day in mills and work shops, to enable them to perfect their knowledge of the branches in which they work, to acquire knowledge of other processes than those in which they are regularly engaged, and to complete in the course of several winters, a thorough technical education without interfering with their daily duties.

Evening students have the option of entering for one or more of seven different courses, and arrangements will be made as far as possible for them to take such a section of each course as is suited to the student's daily occupation in the mill.

- I. Cotton Spinning.
- II. (a) Woolen Spinning. (b) Worsted Spinning.
- III. Designing.
- IV. Chemistry and Dyeing.
- V. Weaving. 

{	(a) Cotton Weaving
	(b) Woolen and Worsted Weaving
	(c) Dobby and Jacquard Weaving
- VI. Mechanics and Electricity.
- VII. Finishing.

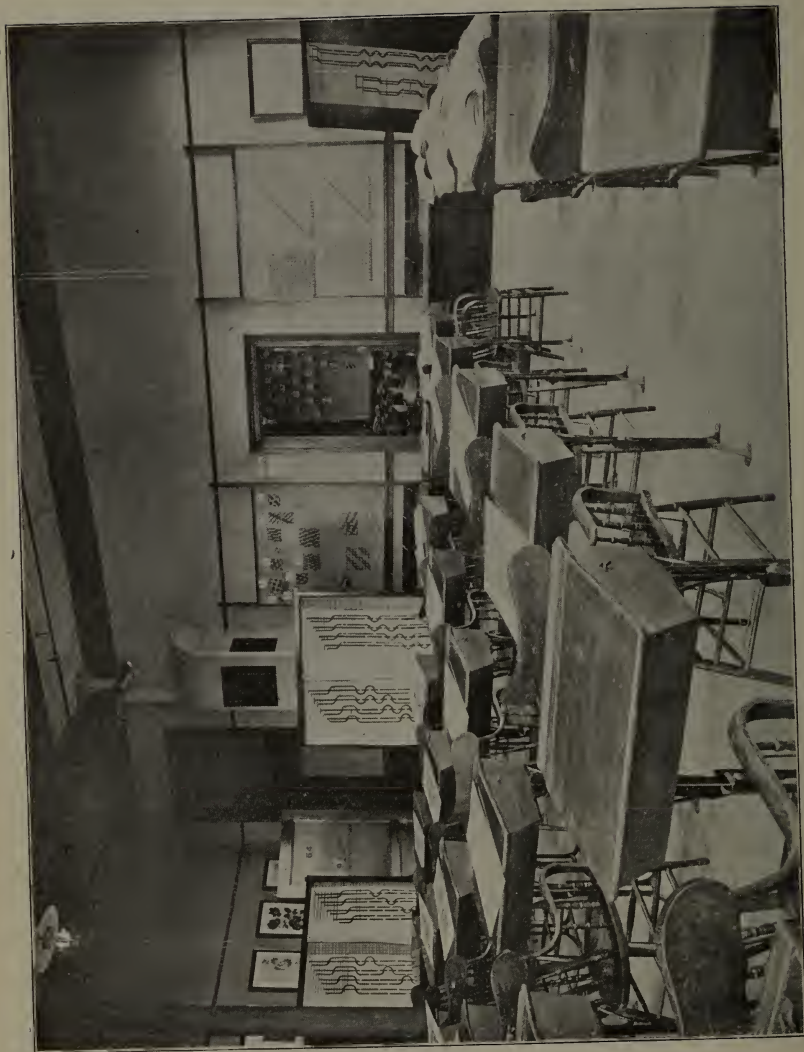
Course IV. requires four years, course III., VI. three years; courses I., IIb., two years each; course VII., IIa., Va., b, or c, one year.

For the satisfactory completion of either of these courses, the certificate of the school will be awarded; the diploma of the school will be awarded in exchange for certificates of satisfactory completion of those subjects which go to make up any one of the several regular diploma courses.

In general it is possible to take up the study of two of the above evening courses concurrently.

## Women's Department

Among the many fields in which woman has entered, none has been found in which her natural refinement of taste and skill can be used to better advantage than in designing; but natural ability,



TEXTILE DESIGN DEPARTMENT



though the prime requisite, is by no means all, for a certain amount of technical knowledge must be gained to achieve success. This department combines decorative art and textile design, and regular attendance is required as in other departments. An instructor is in constant attendance.

### **Commercial Department**

A special course in textile construction and foreign languages is arranged for those contemplating a commercial career.

All such are invited to communicate with the Secretary, since there is demanded in such a course a greater variety of combinations of studies than in the manufacturing courses.

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## **EQUIPMENT**

The equipment of machinery, inventoried January 1, 1906, at \$158,914.49, is the most varied for textile educational purposes, and is being constantly augmented.

### **COTTON DEPARTMENT**

#### **Ginning**

- One 50 saw gin made by Daniel Pratt Gin Co., Prattville, Ala.
- One Prior Roller Gin.

#### **Opening, Picking and Waste Machinery**

- One outfit of Kitson Picking Machinery from works of Kitson Machine Co., Lowell, Mass., including:
- One No. 7 Opener with Automatic Feeder connected by Robinson patent Cleaning Trunk to
- One 40 in. Single Beater Breaker Lapper with Condenser and gauge box feed.
- One 40 in. Single Beater Intermediate Finisher Lapper with Perham & Davis Sectional Plate Evener, apron to double four laps.
- One 40 in. Single Beater Finisher Lapper with Perham & Davis Sectional Plate Evener, apron to double four laps, Kirschner Patent Carding Beater.
- One Roving Waste Opener.
- One Thread Extractor.



FABRIC STRUCTURE AND CLOTH ANALYSIS

### **Carding, Combing and Drawing**

The following machinery made by the Lowell Machine Shop, Lowell, Mass.:

One top Flat Card.

Three Revolving Flat Cards.

From the Whitin Machine Works, Whitinsville, Mass.

One 40 in. Revolving Flat Card.

Card Grinding Rolls.

Stripping rolls, etc., Kitson Machine Co., Lowell, Mass.

From the Whitin Machine Works, Whitinsville, Mass.

One Ribbon Lapper.

One Six Head Comber.

From the Mason Machine Works, Taunton, Mass.

One Silver Lap Machine.

One Comb.

From Lowell Machine Shop, Lowell, Mass.

Two Railway Heads.

Two Drawing Frames.

### **Roving, Spinning and Twisting**

From Lowell Machine Shop, Lowell, Mass.

One Slubber.

One Intermediate.

One Fine Frame.

One Jack Frame.

Three Ring Spinning Frames.

One Spinning Mule.

One Spooler.

One Wet and Dry Twister.

From Whitin Machine Works, Whitinsville, Mass.

Two Ring Spinning Frames.

### **Miscellaneous Machinery of this Department Includes:—**

From the Lowell Machine Shop, Lowell, Mass.

One Reel.

One Model Fine Fly Frame.

One Model Fly Frame Compound.

One Model Card Feed.

One Model Flat Grinding Device.

One Model Scroll Setting device.

From The Universal Winding Co.

One Six head Universal Winder, for cones, tubes or multiple winding.



STUDIO  
DECORATIVE ART DEPARTMENT

From Draper Co., Hopedale, Mass.

One Weeks Banding Machine.

From other manufacturers.

One Yarn Inspection Machine with black boards.

One Barbour Knotter.

Two Yarn Reels and Grain Scales.

One Power Yarn Tester.

One Twist Counter.

### **KNITTING DEPARTMENT**

One Mayo "Acme" Full Automatic Seamless Knitting Machine,  
from Mayo Knitting Machine & Needle Co., Franklin Falls,  
N. H.

One Geo. D. Mayo Full Automatic Seamless Knitting Machine,  
from Geo. D Mayo Mch. Co., Laconia, N. H.

One Brinton Full Automatic Seamless Knitting Machine from  
H. Brinton Co., Phila., Pa.

One McMichael & Wildman Rib Top Knitting Machine from  
Wildman Mfg. Co., Norristown, Pa.

One Wildman Rib Knitting Machine, with Knee and Ankle  
Splicer and Automatic Stop Motion, Wildman Mfg. Co.,  
Norristown, Pa.

One Brinton Rib Knitting Machine with Knee and Ankle Splicer  
and Plaiter, from H. Brinton Co., Phila., Pa.

One Lamb Glove Machine, Lamb Knitting Machine Co., Chicopee Falls, Mass.

One Lamb Sweater Machine, Lamb Knitting Machine Co., Chicopee Falls, Mass.

One Beattie Looper, from Beattie's Mch. Wks., Cohoes, N. Y.

One Grosser, One Section Jacquard Machine, Power Driven,  
from Grosser Knitting Machine Co., N. Y.

### **WOOLEN AND WORSTED DEPARTMENT**

#### **Wool Sorting and Grading**

The department is thoroughly equipped with benches, baskets, etc., for sorting wool in a convenient manner, and in addition samples of all grades and types of wools and other fibres.

#### **Scouring and Carbonizing**

Wool Scouring Machinery, C. G. Sargent's Sons Corp., Graniteville, Mass., consisting of:

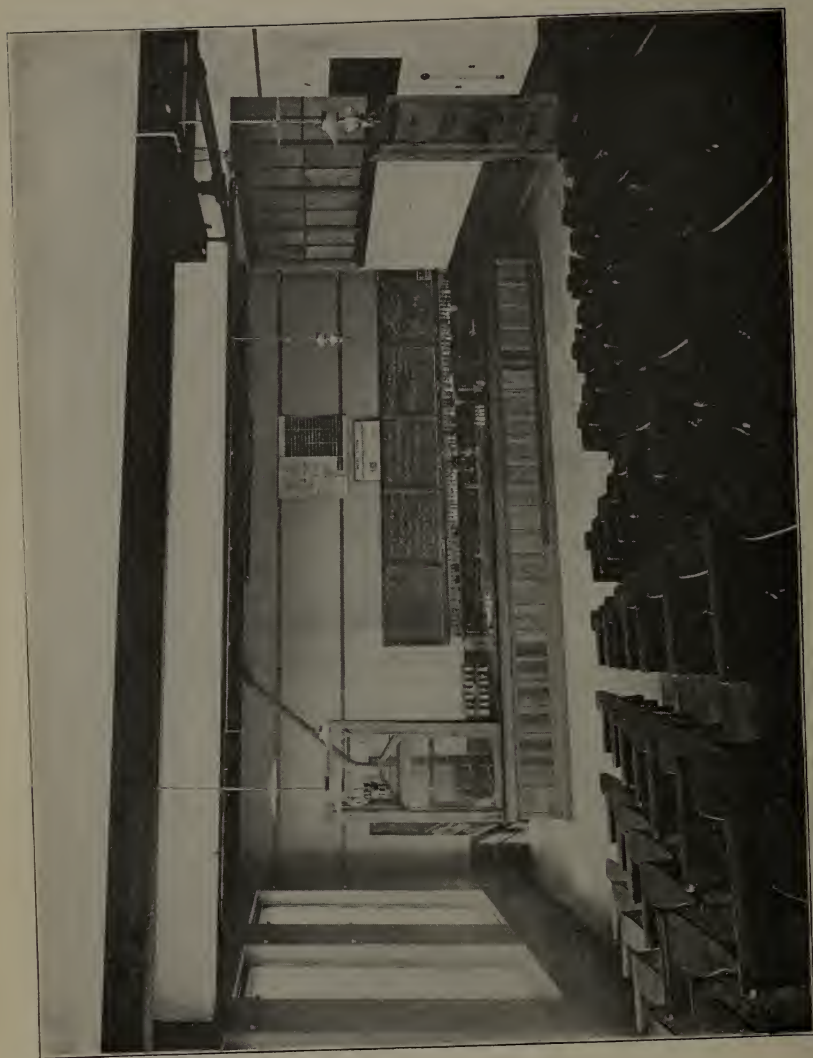
Cone Duster for Grease Wool.

Two Scouring Bowls, each 17 ft. x 24 in., with Parallel Rakes

One Automatic Feeder for Scouring Bowls.

One Automatic Feeder for Dryer.





GENERAL CHEMISTRY LECTURE ROOM



One Single Apron Dryer.  
Carbonizing Screw Acid Tank.  
Carbonizing Duster, with Crush Rolls.  
One Rinse Box, North Chelmsford Machine Co.  
One Schaum & Uhlinger Hydro Extractor.

## WOOLEN

### Picking

One Parkhurst Burr Picker, Atlas Mfg. Co., Newark, N. J.  
One Mixing Picker, Davis & Furber Machine Co., North Andover, Mass., equipped with Improved Mixing Picker Feed, and Spencer Oiler, both made by George S. Harwood & Son, Boston, Mass.

### Carding

One set of Woolen Cards, including:

First Breaker, Second Breaker and Finisher, Davis & Furber Machine Co., North Andover, Mass.; this set of cards equipped with Bramwell First Breaker Feed, George S. Harwood & Son, Boston, Mass.; Torrance Balling Head and Creel, (Torrance Mfg. Co., Harrison, N. J. ) between First Breaker and Second Breaker; Apperly Feed, (George S. Harwood & Son, Boston, Mass.,) between Second Breaker and Finisher, and Combination Rub Rolls and Apron Condenser, (Davis & Furber Machine Co., North Andover, Mass.,) on Finisher. These cards are for medium and coarse work.

One set of Davis & Furber Woolen Cards including:

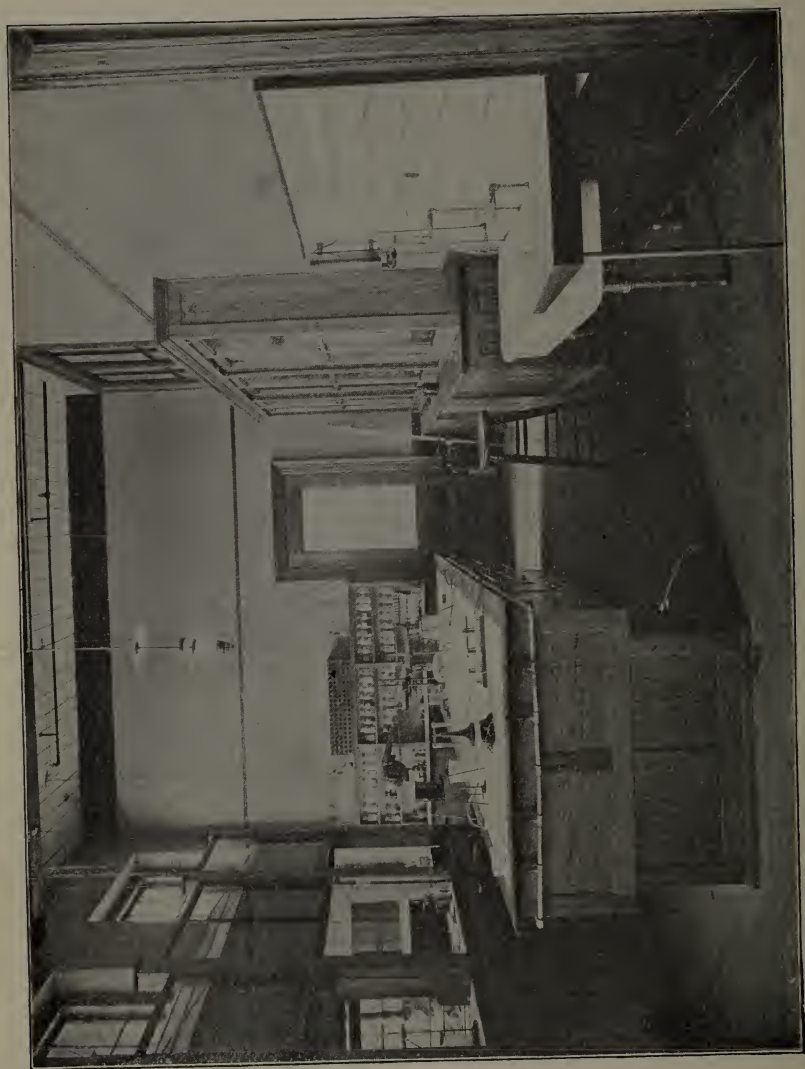
First Breaker, Second Breaker and Finisher. This set of cards equipped with Bramwell First Breaker Feed, (George S. Harwood & Son, Boston, Mass.,) Apperly Feed with Kemp Traveller, (George S. Harwood & Son, Boston, Mass.,) between First Breaker and Second Breaker; Bates Feed, (E. V. Bates, Lowell, Mass.,) between Second Breaker and Finisher, and Davis & Furber Double Apron Condenser, on Finisher. These cards are for fine work.

One Sample Mixing Card, Torrance Mfg. Co., Harrison, N. J.

### Spinning

One Spinning Mule, 120 spindles, made by the Davis & Furber Machine Co., North Andover, Mass.; Bobbin Holders, supplied by American Bobbin Holder Co., W. Medway, Mass.

One Spinning Mule, 120 Spindles, made by Johnson & Bassett, Worcester, Mass.; Bobbin Holders supplied by Murdock & Geb, Franklin, Mass.



GENERAL CHEMISTRY  
PREPARATION LABORATORY

One Woolen Twister, 20 Spindles, made by the Davis & Furber Machine Co., North Andover, Mass.

### **Card Grinding**

One Roy Grinding Frame, made by B. S. Roy & Son, Worcester, Mass.

Two Roy Traverse Grinders, made by B. S. Roy & Son, Worcester, Mass.

One Entwistle Traverse Grinder, made by T. C. Entwistle Co., Lowell, Mass.

One Complete Set of Carders' Tools, W. H. Brown, Worcester, Mass.

## **WORSTED**

### **Carding**

One 50-inch Double-Worsted Card (4 lickerin), Davis & Furber Machine Co., North Andover, Mass., equipped with One Bramwell Feed, George S. Harwood & Son, Boston, Mass.

### **Backwashing**

One Double Bowl, Five Cylinder Back Washer, with Gill Box, Taylor-Wadsworth & Co., Leeds, Eng., equipped with blueing motion, oiling motion, and Layland Patent pressure motion.

### **Gilling**

One Doubling Balling Head Gill Box (with double screws), Lowell Machine Shop, Lowell, Mass.

One Weigh Gill Box and Creel, Lowell Machine Shop, Lowell, Mass.

### **Combing**

One Baller, (punch), Crompton & Knowles, Worcester, Mass.

One Noble Worsted Comb, Crompton & Knowles, Worcester, Mass.

### **Gilling**

One Finishing Can Gill Box, Hall & Stell, Keighley, England.

One Finishing Balling Head Gill Box, Hall & Stell, Keighley, England.

### **Bradford System of Drawing, Spinning and Twisting**

The following Drawing, Spinning and Twisting Machinery, from Prince Smith & Son, Keighley, England.

One Revolving Creel for 12 Balls.

One Double Head Can Gill Box.

One 2 Spindle Gill Box.



DYEING LABORATORY  
SAMPLE PRINTING MACHINE

- One 2 Spindle Drawing Box.
- One 2 Spindle Weigh Box.
- One 4 Spindle First Finisher.
- One 12 Spindle Dandy Reducer.
- One 12 Spindle Cap Spinner.
- One 12 Spindle Flyer Spinner.
- One 12 Spindle Ring Spinner.
- One 12 Spindle 2 Fold Cap Twister.
- One 12 Spindle 6 Fold Ring Twister.

The following Drawing, Spinning and Twisting machinery from the Lowell Machine Shop, Lowell, Mass.:

- One 2 Spindle Drawing Box.
- One 6 Spindle Second Finisher.
- One 24 Spindle Dandy Rover.
- One 6 Spindle Cone Reducer.
- One 8 Spindle Cone Rover.
- One 48 Spindle Cap Spinner (4 foot end).
- One 48 Spindle Cap Spinner (5 foot end).
- One 48 Spindle Boyd Ring Twister.
- One Six Gang Universal Winder, equipped for cones or straight tubes, made by the Universal Winding Co., Boston, Mass.
- One Tape Band Sewing Machine, made by the Singer Mfg. Co., New York.

### **French System of Drawing and Spinning**

The machinery made by the "Societe Alsacienne de Constructions Mechaniques" at Mulhouse, France, consists of the following:—

- One Gill Box de 2 tetes (Gill box with 2 heads).
- Two Etirage a Frottoir tetes (Weigh box 2 heads).
- Three Etirage a Frottoir 2 tetes (Drawing box 2 heads).
- Four Etirage a Frottoir 2 tetes (Drawing box 2 heads).
- Five Etirage Reunion 4 tetes (1st Finisher 4 heads).
- Six Chute de 8 Peignes (2d Finisher 8 porcupines).
- Seven Bobinier 8 Peignes (Slubber 8 porcupines).
- Eight Bobinier 8 Peignes (Reducer 8 porcupines).
- Nine Bobinier 8 Peignes (Rover 8 porcupines).
- Ten Finisseur 16 Peignes (Finisher 16 porcupines).
- One self acting mule, 150 spindles.

## **POWER WEAVING DEPARTMENT**

### **Cotton Warp Preparation**

- One Spooler, made by the Lowell Machine Shop, Lowell, Mass.
- One Warper, made by the Lowell Machine Shop, Lowell, Mass.
- One Slasher, made by the Lowell Machine Shop, Lowell, Mass.





EXPERIMENTAL DYEING LABORATORY



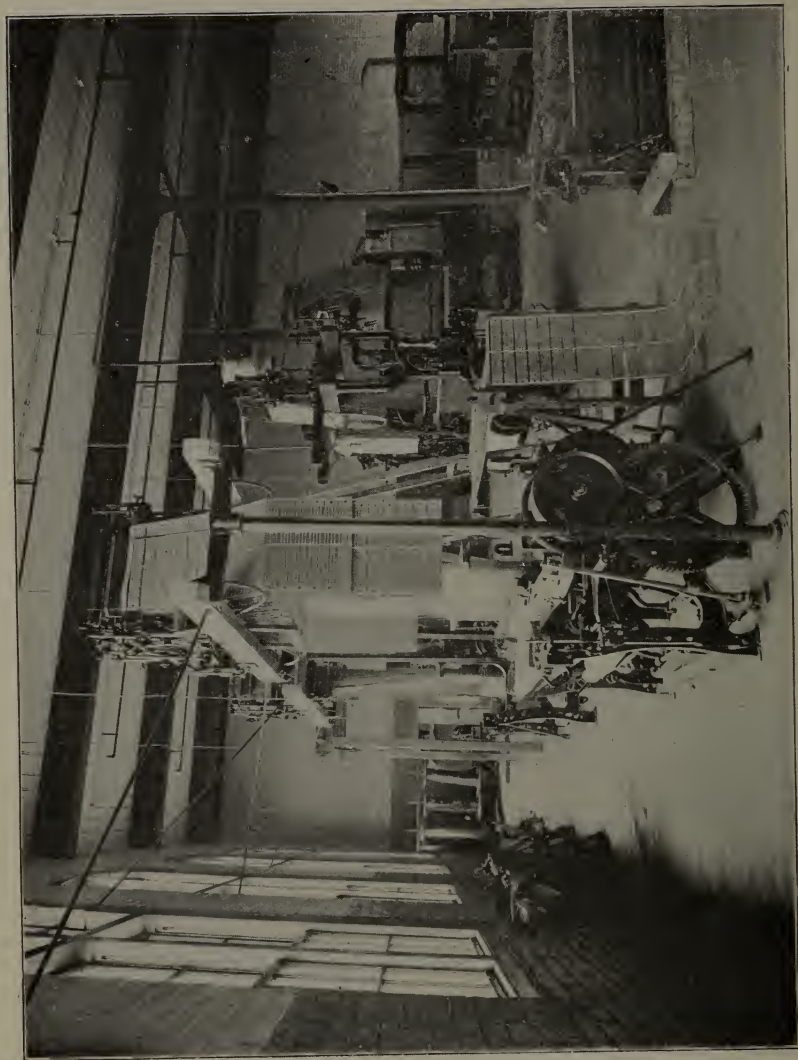
One Beamer, made by T. C. Entwistle, Lowell, Mass.  
 One Winder, made by Altemus & Co., Philadelphia, Pa.  
 One 400 End Improved Draper Warper.  
 Drawing-in Frames, etc.  
 One Pat. Slasher Press Roll, J. Battles & Co., Lawrence, Mass.  
 One Pat. Expansion Comb for Warper, T. C. Entwistle Co., Lowell, Mass.  
 One Quiller, Johnson & Bassett, Worcester, Mass.  
 One Wet and Dry Twister, Draper Co., Hopedale, Mass.  
 Set of six inch spools for Warper, Macrodi Fiber Co., Woonsocket, R. I.

### **Woolen and Worsted Warp Preparation**

One Warp Spooler.  
 One Dresser.  
 One Reel.  
 One Beamer.  
 One 48 Spool Creel.  
 All made by the Davis & Furber Machine Co., North Andover, Mass.  
 Also a number of hand warping and beaming frames.

### **Power Weaving**

One 24 Line Hercules Braider.  
 One 12 Line Braider.  
 One Tubular Braider.  
 One Sautach Braider, Providence, R. I.  
 One plain Northrop Loom, made by the Draper Co., Hopedale, Mass.  
 One Improved Northrop Loom, fine sateen, made by the Draper Co., Hopedale, Mass.  
 One Northrop Loom with dobby.  
 One Plain Print Cloth Loom, made by the Whitin Machine Works, Whitinsville, Mass. To this is attached a Kip-Armstrong Warp Electric Stop Motion.  
 One Side Cam Twill Loom, made by the Whitin Machine Works, Whitinsville, Mass.  
 One Twenty Harness Dobby Loom, made by Whitin Machine Works.  
 One Five Harness Sateen Loom, made by the Lowell Machine Shop, Lowell, Mass.  
 One 400 hook Schaum and Uhlinger Jacquard with Loom.  
 One Plain Print Cloth Loom, made by the Mason Machine Works, Taunton, Mass.  
 One Harriman Automatic Shuttle Changing Loom.



WEAVE ROOM

And the following looms made by the Crompton-Knowles Loom Works, Worcester, Mass., and Providence, R. I.  
 One Model Dobby Attachments.  
 One Knowles Gingham Loom, 4 boxes.  
 One Knowles Fancy Cotton Loom, with 20 harness doobby, 4 boxes, for fancy leno work.  
 One Knowles Fancy Cotton Loom, with 25 harness doobby.  
 One Knowles Blanket Loom, with 25 harness doobby, 4 boxes.  
 One Knowles Gem Loom, 20 harness, 4 x 4 boxes.  
 One Knowles Worsted Loom, 32 harness, 4 x 4 boxes.  
 Three Knowles Heavy Woolen Looms, 25 harness, 4 x 4 boxes.  
 One Knowles Fancy Loom, with single lift Jacquard.  
 One Knowles Fancy Loom, with double lift Jacquard.  
 One Knowles Fancy Loom, with Jacquard tied up for leno.  
 One Knowles Ingrain Carpet Loom, 4 x 4 boxes.  
 One Crompton Gingham Loom, 4 x 1 boxes.  
 One Crompton Fancy Loom, 6 x 1, with double cylinder, 20 harness doobby.  
 One Crompton Fancy Cotton Loom, with single cylinder, 20 harness doobby.  
 One Crompton Jean Loom.  
 One Stafford Silk Loom, with 1200 hook Halton Jacquard.  
 One Crompton Lappet Loom, with 16 harness doobby.  
 One Crompton Towel Loom, 2 x 1 boxes.  
 One Crompton Ingrain Carpet Loom, 4 x 4 boxes.  
 One Crompton Worsted Loom, 24 harness, 4 x 4 boxes.  
 One Crompton & Knowles Heavy Loom, 20 harness, 4 x 4 boxes.  
 One Crompton-Knowles 72" Tapestry Loom, upon which is mounted a 2600 hook Halton Tapestry Jacquard Head.  
 One Lewiston Machine Co. Loom, 4 harness, side cam.  
 One Lewiston Machine Co., Bag Loom.  
 One Kilburn & Lincoln Plain Loom.  
 Eight Lowell Machine Shop Plain Looms.  
 One English Loom.  
 One Jacquard Piano Card Cutting Machine, from John Royle & Sons, Paterson, N. J.  
 One 800 hook Jacquard, J. Battles & Co., Lawrence, Mass.

## HAND LOOM DEPARTMENT

Twelve Hand Looms, 2 x 3 boxes, with 20 harness doobby.  
 Eight Hand Looms, 4 x 4 boxes, with 24 harness doobby.  
 Six Hand Looms, 3 x 3 boxes, with 32 harness doobby.  
 Six Hand Looms, 4 x 4 boxes, with 30 harness doobby.  
 Two Hand Looms, with treadles.



Two Hand Looms, 4 x 4 boxes, with 200 hook Jacquard.  
Two Hand Looms, 3 x 3 boxes, 200 hook Jacquard.  
Two Hand Looms, 3 x 3 boxes, with 600 hook Jacquard.

**The Silk Preparing Machinery Consists of:—**

One Winder.

One Quiller.

One Warper.

One Beamer.

One Double Frame.

All made by the Atwood Machine Co., Stonington, Conn.

**CHEMISTRY AND DYEING DEPARTMENT**

**The Chemical Laboratories**

The General Chemistry and Qualitative Analysis Laboratory includes :  
One hundred and twenty laboratory desks, each containing a full set  
of apparatus for the first year's work in chemistry; also gas and  
water fittings, reagents and sinks.

Four Large Double Hoods.

Two Steam Baths.

One Parson's Automatic Gas Generator.

**The Quantitative Laboratory**

One Water Distilling Apparatus.

One Steam Drying Closet.

One Large Steam Bath.

One Electrolytic Table.

Five Hoods.

Twenty-six laboratory desks, each fully provided with apparatus.

**The Balance Room**

One Large Christian Becker Analytical Balance.

Three Small Christian Becker Analytical Balances.

One Standinger Analytical Balance.

One Eimer & Amend Analytical Balance.

One H. L. Becker's Son & Co. Analytical Balance.

**The Combustion Room**

One Combustion Furnace, 25 burners.

One Lothar Meyer's Furnace for tubes.

One Kerosene Burner Muffle Furnace.





WEAVE ROOM



### **The Microscopical and Volumetric Laboratory**

Two Benches for volumetric analysis.

Two Benches for microscopical work.

Three Bausch & Lomb Compound Microscopes.

One Nachet et Fils Compound Microscope.

Desk and shelves for the apparatus and reagents necessary for this branch of the work.

Adjoining this laboratory is a dark room for Spectrum Analysis, Photometric Work, etc.

### **The Assistant Instructors' Laboratory**

One Large Case for chemicals.

One Double Hood.

One Copper Water Bath.

One Soapstone Sink with a drain board.

Benches, desks and complete fittings for water, gas and suction.

### **The Private Laboratory**

One Christian Becker Balance.

One Case for Chemicals and Apparatus.

Three Laboratory Benches, with necessary fittings.

One Large Hood.

One Steam Bath.

One Experimental Dye Apparatus.

One Porcelain Sink.

### **The Chemical Lecture Room**

Is provided with a lecture table fully equipped with gas, water, sinks, a hood and sufficient apparatus for lecture experiments.

An electric arc reflectroscope provided with suitable screen, thus making it possible to illustrate a lecture either from slides or by cuts, photographs and objects.

Seats are provided for 80 students, being arranged on a raised floor so that every student has a full view of the lecture table.

This room contains various collections of dye stuffs and chemicals for exhibition and for lecture demonstration.

### **Experimental Dyeing and Printing Department**

The dyeing laboratory is equipped with individual benches, small dyeing apparatus, reels, balances, apparatus for dye testing, such as frames for exposing dyed material to light, and a complete collection of dyestuff samples and sample cards.

One Small Hydro-Extractor, from W. H. Tolhurst & Sons, Troy, N. Y.



Twenty-four Steam Jacketed Experimental Dyeing Machines.

One Drying Chamber.

One Ageing Chamber.

The private dyeing laboratory is well equipped with the necessary apparatus for experimental dyeing and research work.

One Calico Printing Machine, made by Mather & Platt, Oldham, England.

One Iron Jacketed Steaming Chamber from A. Edmeston & Son, Salford, England.

One set of Steam Jacketed Copper Kettles.

### **Commercial Dyeing Department**

One Kier, Atlantic Works, East Boston, Mass.

One 4 String Dyeing Machine, Rodney Hunt Machine Co., Orange, Mass.

One Mercerizing Machine.

One Raw Stock Dyeing Machine, Klauder-Weldon Dyeing Machine Co., Amsterdam, N. Y.

One Yarn Dyeing Machine, Klauder-Weldon Dyeing Machine Co., Amsterdam, N. Y.

One Jig Dyeing Machine, The Textile-Finishing Machinery Co., Providence, R. I.

One Set of Drying Cans, The Textile-Finishing Machinery Co., Providence, R. I.

One Chain Dyeing Machine, T. C. Entwistle Co., Lowell, Mass.

One Raw Stock Drying Table, Philadelphia Textile Machinery Co., Philadelphia, Pa.

One Padding Machine, Arlington Machine Works, Arlington, Mass.

One Hydro-Extractor.

Seven Dye Tubs.

### **FINISHING DEPARTMENT**

One 2 String Washer, Rodney Hunt Co., Orange, Mass.

One Fulling Mill, Rodney Hunt Co., Orange, Mass.

One Up and Down, Dry Gig, Curtis and Marble, Worcester, Mass.

One Rolling and Stretching Machine, Curtis and Marble, Worcester, Mass.

One Up and Down Wet Gig, Curtis and Marble, Worcester, Mass.

One Steam Finishing Machine, Curtis and Marble, Worcester, Mass.

One Two Cylinder Double Acting Brushing Machine, Curtis and Marble, Worcester, Mass.

One 60" 4 Cylinder Sanding and Polishing Machine, Curtis and Marble, Worcester, Mass.

One Kicking Mill, James Hunter & Co., No. Adams, Mass.

One 6-4 Double Shear, Parks & Woolson, Springfield, Vt.



MECHANICAL DRAWING ROOM

- One 6-4 Voelker Rotary Press, G. W. Voelker & Co., Woonsocket, R. I.
- One Tentering and Drying Machine, John Heathcote, Providence, R. I.
- One Single Crabbing Machine, H. W. Butterworth & Son, Philadelphia, Pa.
- One 72" Woolen Napper, Davis & Furber, No. Andover, Mass.
- One 32" Basket Hydro-Extractor, W. H. Tolhurst & Son, Troy, N. Y.
- One Measuring Machine, Fabric Measuring and Packaging Co., N. Y., Parks & Woolson.
- One Sewing Machine, Birch Brothers, Somerville, Mass.
- Also soap tanks, perch, burling and measuring tables.

## **MECHANICAL DEPARTMENT**

### **Physical Laboratory**

Through the generosity of a friend of the School a laboratory has been provided with the most approved apparatus for testing the physical properties of all fibres, yarns, and fabrics; the equipment includes:

- One Bausch and Lomb D. D. Microscope.
- Two inch, 1 inch, and 1-2 inch regular eyepieces.
- Three-fourths inch (photographic,) 2-3 inch, 1-6 inch, 1-12 inch (oil immersion) objectives.
- One Nicol prism polarizer and analyzer.
- One Eye Piece Micrometer.
- One Filar Micrometer, (1 inch equivalent eye piece) for refined diameter determinations.
- One Standard Glass Stage, divided to 1-10 and 1-100 m. m., with corrections as tested against the International m. m.
- Complete outfit for mounting slides.
- Complete outfit for photo micography.
- Camera Lucida.
- Microtome Sectioning Outfit.
- One Small Skein Testing Machine.
- One set Conditioning Ovens for moisture determination.
- One Yarn Testing Machine, adjusted to test strength, twist, take up, elasticity, and stretch.
- One Hydraulic Cloth Strength Testing Machine.
- One Brown & Sharpe Metre Reel.

### **Power, Light, Heat and Ventilation**

- One 300 H. P. Aultman and Taylor Horizontal Water Tube Boiler, equipped with U. S. Rocking Grates.
- Two 100 H. P. Stirling Water Tube Boilers.
- One Sturtevant Induced Draft Apparatus, including fan, direct connected to the Sturtevant vertical engine and equipped with two way dampers.





MECHANICAL ENGINEERING  
CLASS ROOM



- One Sturtevant Smoke Filtering Apparatus.
- One Foster Reducing Valve used as automatic pressure regulator for draft engine.
- One Locke Steam Pressure Regulator for draft engine.
- One Knowles Boiler Feed Pump, 6 in. x 4 in. x 6 in.
- One Warren Webster Feed Water Filter, heater and oil extractor.
- One Payne 14 in. x 14 in. Automatic High Speed Engine of 125 H. P. and 260 r. p. m.
- One 9 1-2 in. x 11 3-4 in. Nash Gas Engine of 50 H. P. of the three cylinder type, with speed regulating clutch and hit and miss governor.
- One Motor Driven Air Compressor 5 1-2 in. x 6 in. with a storage tank of 20 cubic feet capacity, 100 lbs. per sq. in. pressure.
- One Complete Sturtevant Double Duct System for heating and ventilating Southwick Hall. This apparatus is designed to provide the proper amount of fresh warm air called for by the State law as applied to educational institutions, and includes a 9ft. x 4ft. fan direct connected to the Sturtevant horizontal engine, drip tank and Knowles automatic return pump, 4 1-2 in. x 2 3-4 in. x 4 in. arranged to deliver either to the feed water heater or to the boilers direct.
- One Sturtevant Fan and Heater for Kitson Hall and Falmouth Street Building, direct connected to a Sturtevant inverted engine.
- One Cross Oil Filter.
- One Complete Moistening Apparatus installed by the American Moistening Co., Boston, Mass., including Knowles triplex 4 x 4 power pump, tank, and 18 moistening heads.
- One Complete Sprinkler System for fire protection, using the Grinnell glass button heads.
- One Bullock 75 K. W. Direct Current Multipolar Compound Generator, wound for 220 volts, over compounded 20 volts from no load to full load and direct connected to the Payne engine.
- One Bullock 30 K. W. Generator of the same type, direct connected to the Nash gas engine. The switch board is arranged so that either unit may be thrown in independently on the power or lighting feeders or the two machines may be run in parallel. The lighting circuits are on the two wire 220 volt system and supply the equivalent of 660-16 candle power lamps. The power circuits are on the same system and supply approximately 140 H. P. in motors.
- Three 24 H. P. Bullock Motors.
- One 20 H. P. General Electric Motor.
- Four 15 H. P. Bullock Motors.
- One 3 H. P. Motor from New England Motor Co.
- One 2 H. P. Motor from Holtzer-Cabot Electric Co.
- One 4 H. P. G. E. Electric Dynamometer which may be used as a double current generator or rotary transformer receiving direct current at



ELECTRICAL ENGINEERING  
LABORATORY

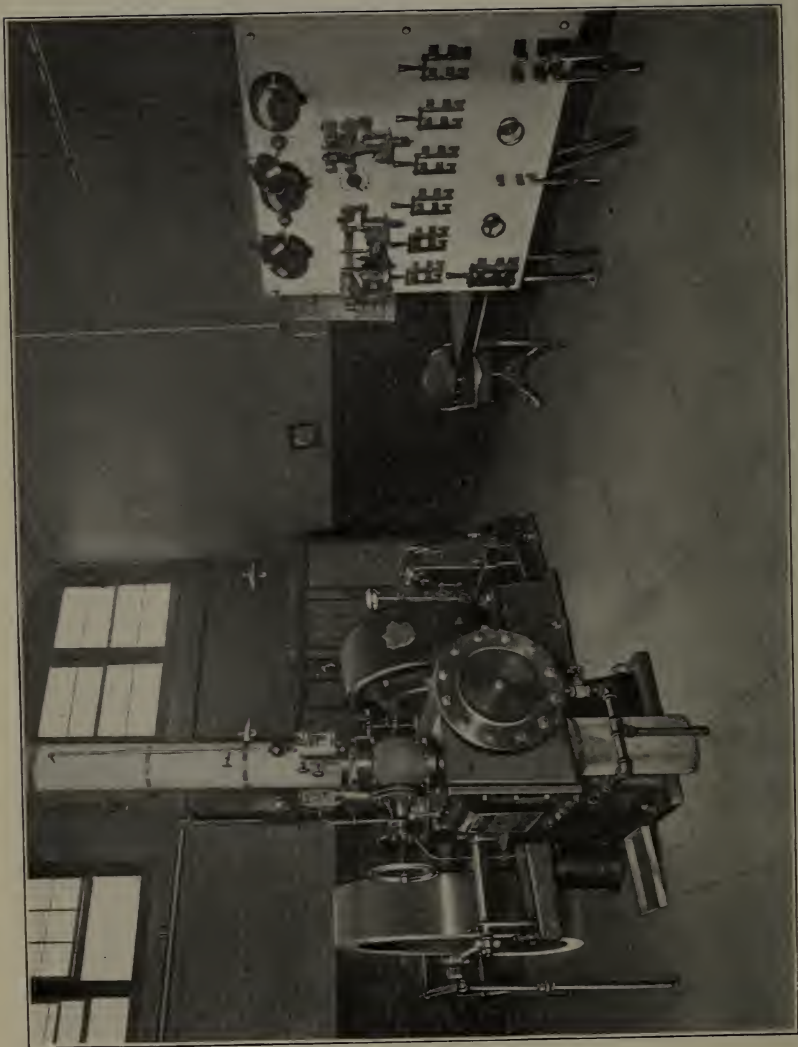
- 220 volts and delivering three phase alternating current which by a step-up transformer will give 220 volts at 60 cycles.
- One 250 volt Weston Portable Voltmeter.
  - One 250 volt Weston Portable Voltmeter with calibrating coil.
  - One 150 ampere Weston Portable Ammeter.
  - One Weston Portable Millivoltmeter with 200 milli-volt and 20 milli-volt scales.
  - One 2 ampere and one 20 ampere shunt for use with above instrument as an ammeter.
  - One D'Arsonval Reflecting Galvanometer.
  - One Simple Galvanometer.
  - One Wheatstone Bridge.
  - Two Direct Current Self Feeding Arc Lamps.
  - Two Hand Feed Arc Lamps for stereopticons
  - Resistance boxes of various sizes and other apparatus necessary for commercial testing of lamps, motors, etc.
  - An Exhibition Board containing samples of the Chloride and Exide Storage Battery Plates donated by the Electric Storage Battery Co. of Philadelphia.
  - One Buff and Buff Surveyor's Transit and Rod.

All of the above apparatus is available for experimental work and affords opportunities for laboratory practice for the classes in mechanical and electrical engineering.

### **Athletic Field**

Through the generosity of Mr. Frederick Fanning Ayer, the school has been provided with a Campus and Athletic Field of about three acres. This has been carefully graded and laid out for base ball, foot ball and track athletics. Bleachers have been provided which are used for either the out-of-door games or for basket ball played in a hall specially equipped for this game.

The athletic interest is growing yearly and receives the encouragement of the management.



STEAM ENGINE UNIT  
ENGINE ROOM

## **DAY CLASSES**

### **Entrance Qualifications**

Candidates for admission will be accepted upon presentation of properly vouched certificate showing the completion of a regular four year High School course. For all others, there will be held examinations, as stated in calendar; candidates failing to pass at June examinations will be allowed to try again in September; those who cannot attend the June examinations, may present themselves in September; if conditioned, a further examination will be appointed. Requirements in general will be as follows:

#### **Arithmetic**

Definitions; elementary, operations in addition, subtraction, multiplication and division; squares; cubes; square root; interest, discount; fractions, simple and complex; decimals; percentage, alligation; ratio and proportion. Metric System.

#### **English**

The candidates will be expected to correct examples of bad English, for spelling, punctuation, capitalization, grammar and sense; also to write a short composition on a given familiar theme.

#### **Geography**

Location of principal countries, with capitals, large rivers, mountains, etc., noting characteristics of climate, productions and inhabitants. General statements rather than specialization will be sought.

#### **Algebra**

Definition; fundamental operations, parenthesis, factoring; highest common factor; least common multiple; fractions, simple and complex; simple equations, one or more unknown quantities; involution and evolution;; square and cube root; logarithms.

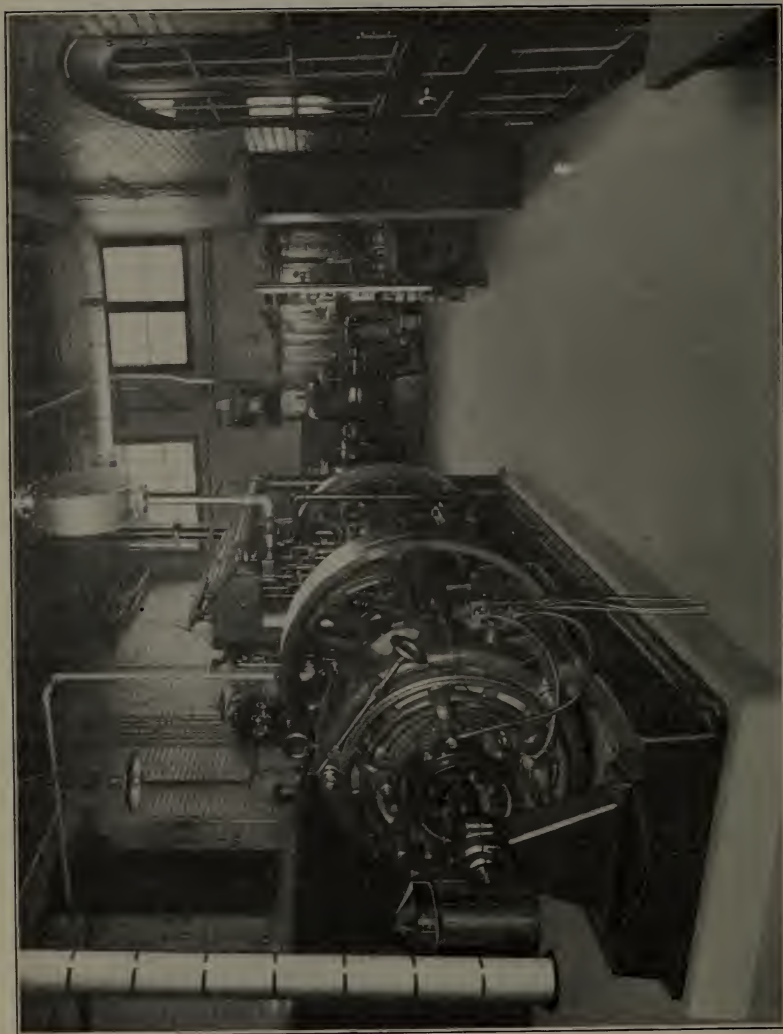
#### **Geometry**

As much plane geometry as is included in any of the generally accepted text books. The student should be familiar with properties of plane rectilinear figures, the measurement of angles, the circle, polygons, etc.

#### **Preparation**

In a preparatory course, particular attention should be given to algebra, geometry, manual training, chemistry, physics (including mechanics, heat, light and electricity), French and German. For those who intend to take Chemistry and Dyeing, physics is almost indispensable.





GAS ENGINE UNIT  
ENGINE ROOM



## **Advanced Standing**

Candidates who may have received previous training in any of the subjects ordinarily taken in the regular course may present themselves for examination as per calendar. If a satisfactory rank be attained, they will be given such further work as will be best suited to their advancement.

## **Attendance Card**

At the beginning of each term all students must fill out and file with the Secretary on blank forms which are provided, a formal application for such subjects as he may choose, subject to the approval of the Secretary. When an attendance card is once approved, no change can be made except through the Secretary.

## **Application Blanks**

A blank form of application may be found at the end of this bulletin. This should be properly filled out by all applicants.

## **Fees**

The fee for the day course is \$100 per year for residents of Massachusetts; for non-residents it is \$150 per year.

Three-fifths of the fee is charged for a single term and is payable on or before October 10, the balance on or before February 10, of each year. After payment is made, no fee or part thereof can be returned, except by special action of the Trustees.

Special students pay, in general, the full fee, but if a course be taken involving attendance at the school during a limited time, application may be made to the Secretary for a reduction.

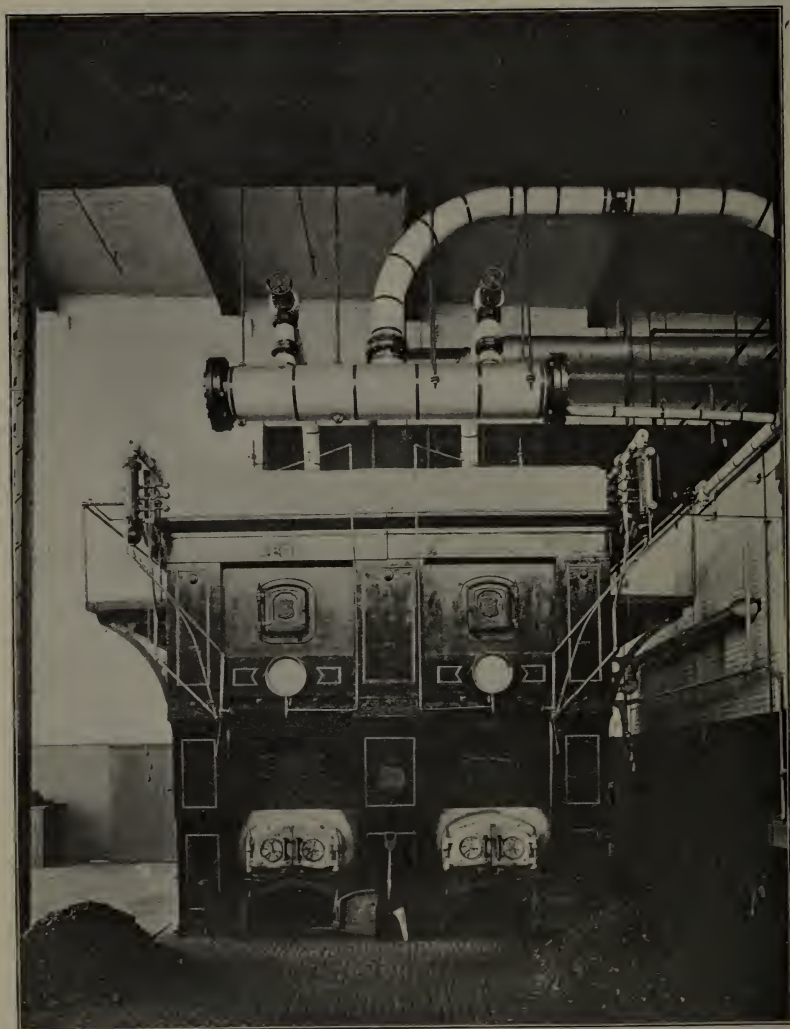
Students must provide their own books, stationery, tools, etc., and pay for any breakage or damage that they cause. The above fee includes free admission to any of the evening classes in which there is accommodation, should any day student desire to attend.

For all first year students a minimum deposit of \$20 will be required to cover the cost of breakage in the chemical laboratory, the unexpended balance to be returned to the student at the end of the year.

For all students in second or third year taking Chemistry or Dyeing Laboratories a deposit of \$15 per term will be required. The unexpended balance will be returned at end of year.

The fees for the evening classes vary and are indicated elsewhere.

Fees are strictly payable in advance, and students whose fees remain unpaid after the above mentioned dates will not be admitted to classes.



BOILER HOUSE

### **Aid to Students**

Free scholarships have not been provided for but provision will be made for applicants for the day courses who have the qualifications for matriculation and are properly vouched for, who furnish satisfactory evidence that they are unable at entrance to meet the charges in whole or in part for tuition.

### **Examinations**

Examinations will be held at the end of each term.

Students who do not show sufficiently satisfactory progress in the final examinations at the end of the first year will not be admitted to the second year classes, and the same applies to second year students with reference to their admission to the third year classes.

Intermediate examinations will be held, which will serve to inform the student as to progress made, or lack of it, and may be appointed at any time.

In general, the examinations will cover the work of the preceding term, but at the end of the third year, candidates for diplomas may be examined on all preceding work.

Daily work and regularity of attendance will also be considered in making up the reports of standing.

Continued or persistent absence (or tardiness) from the classes will be considered sufficient reason to exclude a student from the class.

### **Reports of Standing**

Twice during each term informal reports are sent to students, or to guardians of such as are not of age; and at the end of each term formal reports are made.

### **Thesis**

All candidates for the diploma of the school must file with the Secretary not later than May 15, a report of original investigation, or research, written on a good quality of paper, 8x10 inches, with one inch margin at left, and 1-2 inch at right of each page; such thesis to have been previously approved by the head of the department in which it is made.

### **Graduate Course**

Graduates of technical courses of other schools are invited to communicate with the Secretary with reference to special courses in the textile studies. Previous training in the engineering branches will usually reduce materially the time necessary to complete any of the courses at this school. The advantages offered to such persons for special research work are unexcelled, and a most profitable course may be arranged.

## **The Regular Courses**

The title of each of the regular courses is an indication of the particular nature of the course, unless it be in the case of Course III. There is a considerable demand for a general textile course in which the whole subject may be treated broadly; this course is organized with this particular object in view, although various options are offered, in which some one branch may be followed at length. Certain general studies are included in each course, in order that in specializing, a too narrow view may be avoided.

## **Special Courses**

While it is always urged that regular courses be followed if possible, there is opportunity to make special arrangements to fit for particular positions, as for example:—yarn mill, weaving special fabrics, designing, etc., and owing to the large number of possibilities, those desiring such courses are invited to correspond with the Secretary.

## **Diploma**

The diploma of the School is awarded upon the satisfactory completion of a regular course, covering not less than three years, except where entrance is to advanced standing. In such cases at least one year's residence will be required.

## **Certificate**

For the satisfactory completion of a three years' course in any special department, the certificate of the School will be awarded; it is possible to complete such a course in less than three years, if the candidate be passed to advanced standing, but at least one year's attendance will be required.

## **Medal of Honor**

The New England Cotton Manufacturers' Association offers annually a medal to that member of the graduating class who shall be selected by a committee of the Association as best fitted to receive it.

## **Special Awards of Merit**

The following prizes have been offered by a friend of the School:

First:—Ten dollars to the regular student in either the Second or Third Year class who shall write the best article upon one of five specified subjects to be selected by the Faculty.

Second:—Ten dollars to the student taking any regular course in the school, who shall be considered as having attained the highest scholarship in First Year Chemistry.

Third:—Ten dollars to the student taking any regular course, other than the Chemistry and Dyeing course, who shall be considered as having attained the highest scholarship in the Second Year Textile Chemistry and Dyeing.

Fourth:—Ten dollars to the regular student of the Chemistry and Dyeing course who shall be considered as having obtained the highest scholarship during his Second Year.

Fifth:—Twenty dollars to the regular student in the Chemistry and Dyeing course who shall present the best Thesis at his graduation.

The above sums to be invested in books and the awards to be made each June by such persons as the faculty of the school shall designate. In case no one is considered as being worthy of any particular scholarship, the same may be withheld and added proportionately to the scholarships awarded.

These awards to be first made in June, 1906, and to continue indefinitely.

### Conduct

Day students are expected to attend all lectures, classes and demonstrations of practical work, except when permission to be absent has been obtained from the Secretary. In cases of sickness or other unavoidable absence, written explanation must be sent to the Secretary. The daily work of the student forms an important part of his record, and no student will be awarded the diploma unless this portion of his record is clear.

Books will be prescribed for study, for entry of lecture notes and other exercises, and will be periodically examined by the lecturers. The care and accuracy with which these books are kept will be considered in determining standing.

Students are required to return to the proper place all instruments or apparatus used in experimental work and to leave all machinery and apparatus with which they may experiment clean and in working order. All breakages, accidents, or irregularities of any kind must be reported immediately to the head of the department, or instructor in charge.

In the cases of either day or evening students, irregular attendance, lack of punctuality, neglect of either school or home work, disorderly or ungentlemanly conduct or general insubordination, will be considered good and sufficient reason for the immediate suspension of a student, and a report to the Corporation for such action as it deems necessary to take.

Apparatus used in the Dyeing or Chemical Laboratory will be provided by the School, but a deposit must be made by the student at the beginning of the term sufficient to cover its cost, and this deposit will be returned to him at the close of the term, subject to such deduction as will reimburse the School for broken or damaged articles and material used.



## **Library**

The School Library is supplied with leading textile books and with works dealing with science, art or industries allied to the textile trades. The leading textile papers are kept on file.

## **Sessions**

The regular school sessions will be in general from 8.30 a. m. till 12.30 p. m., and from 2 to 4.30 p. m., except Saturdays, when the buildings will be closed in the afternoon.

A tabular view will designate the hours at which the various classes meet. This will be rigidly adhered to and the register will be marked for each lecture or demonstration.

## **General**

Students from a distance, requiring rooms and board in the city, may, if they desire it, select the same from a list which is kept at the School. The cost of rooms and board in a good district is from \$4 per week upwards.

All raw stock and yarn provided by the School, and all the productions of the School remain, or become, the property of the Trustees, except by special arrangement, but each student will be allowed to retain specimens of yarn or fabrics that he has produced, if mounted and tabulated in accordance with the requirements of the school. It is understood that the Trustees may retain in the School such specimens of student's work as they may determine.

Prospective students who are desirous of arranging special courses by omitting a portion of one course and adding a portion of another, are invited to communicate with the Secretary.

An additional entrance examination to suit the convenience of students from a distance (out of New England,) will be arranged.

Lock boxes will be provided for the use of students, sufficiently capacious to contain clothing, books and tools. A deposit of 25 cents will be required, which will be returned to the student upon surrender of the locker key.

No books, instruments, or other property of the School will be loaned to the students, to be removed from the premises.

## **Materials**

Students must purchase such tools, instruments, text books, and apparatus as may from time to time be recommended by the head of each department, and the cost of these for day students will be from \$15 to \$20, and for evening students from \$1 upwards, according to the subject studied.



### Awards

Gold Medal, Paris Exposition, 1900, for general excellence. A special Medal, Merchants and Manufacturers Exposition, Boston, 1900. The Pan American Medal awarded to the School, 1901. Gold Medal, Louisiana Purchase Exposition, 1904. Gold Medal, Lewis and Clark Centennial Exposition, 1905.

### Bulletins and Catalogue

All students registering and paying the regular fee for the course selected will be entitled to the Bulletins and Catalogue when issued.

Sample copies may be had on application to the Secretary.

## Courses of Instruction

### DAY CLASSES

In the column headed "Hours of Exercise" the numbers represent for each particular subject the total hours required for a period of fifteen weeks.

For detail description of the subjects taught see pages 74

FOR EVENING CLASSES SEE PAGES 97

### FIRST YEAR

#### FIRST TERM

(Common to all courses)

	Hours of Exercises
Elements of Mechanism	60
Mechanical Drawing	97
Mathematics	30
Hand Looms	55
General Chemistry	187
Freehand Drawing	15
Decorative Art	15
Options : German	20
Spanish	20

## COURSE I.—COTTON MANUFACTURING

The Cotton Manufacturing Course is designed for students who contemplate a career in the manufacturing industry of cotton fabrics.

During the first term of the first year, the studies are common to all courses and include instruction in elementary mechanism, mathematics, mechanical drawing, general chemistry and decorative art. Laboratory work supplements the lectures in chemistry and hand loom weaving assists in fixing the elementary principles of textile design.

The work in the Cotton Yarn Department comprises instruction in all the processes from the bale to the finished yarn. The instruction consists of a course of lectures upon the machines and processes, including specialties, costs, etc., and laboratory work upon the machines themselves. In the latter branch the student is given an opportunity to tear down, put together and readjust the machines, thus becoming familiar with their construction as well as their operation.

The course in chemistry is continued through qualitative analysis and inorganic chemistry to textile chemistry and dyeing, and is completed at the end of the second year.

The work in mechanism is followed by steam engineering, electricity, hydraulics and mill engineering. The mechanical drawing taken with these subjects assists in laying out and solving specific problems.

The course in designing includes lectures on plain and fancy weaves and Jacquard work, the analysis of all commercial fabrics, and designs for the same. It is continued throughout the three years.

Power weaving is taken up during the second and third years. Commencing with lectures and practice on plain looms, the student is taken through dobby and box loom weaving to Jacquards. A course in knitting during the third year takes up the manufacture of hosiery and underwear. During his last year the student has an opportunity to work out original ideas and designs in regard to the spinning and weaving of cotton, thus becoming familiar with all branches of the industry.

For detail description see pages 74, 75.

## COURSE I.—COTTON MANUFACTURING

### FIRST YEAR

*(For First Term see page 63)*

#### SECOND TERM

	Hours of Exercise		Hours of Exercise
Cotton Manipulation	105	General Chemistry	30
Textile Design and Cloth Analysis	60	Textile Chemistry	15
Hand Looms	55	Freehand Drawing and Decorative	
Elements of Mechanism	60	Art	52
Trigonometry	30	Mechanical Drawing	67
Language (German or Spanish)	20		

### SECOND YEAR

#### FIRST TERM

Cotton Spinning	225	Machine Drawing	40
Textile Design and Cloth Analysis	60	Mechanical Engineering	45
Textile Chemistry and Dyeing	60	Power Weaving	60

#### SECOND TERM

Cotton Spinning	142	Mechanical Engineering	30
Textile Design and Cloth Analysis	60	Elements of Electricity	30
Textile Chemistry and Dyeing	97	Power Loom Weaving	97
Machine Drawing			40

### THIRD YEAR

#### FIRST TERM

Cotton Spinning	195	Power Loom Weaving	135
Textile Design and Cloth Analysis	60	Knitting Machinery	45
Hand Looms	30	Mill Engineering	15
Electrical Engineering			30

#### SECOND TERM

Cotton Spinning	172	Power Loom Weaving	142
Textile Design and Cloth Analysis	60	Mill Engineering	30
Thesis		Knitting Machinery	45
		Physical Laboratory	30

## COURSE II. — WOOLEN AND WORSTED MANUFACTURING

The course of Woollen and Worsted Manufacturing is arranged for those who contemplate a career in the manufacture of woollen or worsted fabrics. It includes instruction in all of the varied processes employed in adapting the wool fibre to cloth, namely, — sorting, scouring, carding, combing, spinning, designing, weaving, dyeing and finishing. The work is carried on by lectures, recitations and practical work in the laboratories.

Following the first term, which is common to all courses, the student in his second term commences work in the Woollen and Worsted Laboratory, and through systematic steps is acquainted with the machines employed in the first steps of yarn manufacturing. At the same time lectures are given upon the many kinds of wool, variation in quality, grades, uses, etc., as influenced by the locality where grown. This is followed by practical work on the sorting table.

The second and third years cover spinning of woollen yarn and worsted yarn by the Bradford and French systems, also the manufacture of tops, including combing, gilling and back washing. Scouring and carbonizing are taken up in detail by lectures and by practical work.

The General Chemistry of the first year leads to Organic Chemistry, followed by Textile Chemistry and Dyeing in the second year. This includes a short course in the Dyeing Laboratory.

Textile Designing, Cloth Analysis and Construction are continued from the first year throughout the course, the work being applied especially to woollen and worsted goods. Weaving on power looms commences in the second year and continues through the third.

Lectures on Finishing commence with the third year and are augmented by extensive practice with the machines in the Finishing Department.

Work in the Mechanical Department extends throughout all three years and includes mechanical drawing, properties of saturated steam, electricity and hydraulics. The practical application of the principles studied in these subjects is brought out forcibly in the work on Mill Engineering, where mill design and construction are considered. A short course covering methods employed in the testing of fibres, yarns and cloths, together with laboratory work in the manipulation of certain physical apparatus, is given in the second and third years.

For detail description of the subjects see pages 76-80

## COURSE II. — WOOL MANUFACTURING

### FIRST YEAR

*(For First Term see page 63)*

#### SECOND TERM

	Hours of Exercise		Hours of Exercise
Woolen Carding and Spinning	105	General Chemistry	30
Textile Design and Cloth Analysis	60	Textile Chemistry	15
Hand Looms	55	Freehand Drawing and Decorative	
Elements of Mechanism	60	Art	52
Trigonometry	30	Mechanical Drawing	67
Language (German or Spanish)	20		

### SECOND YEAR

#### FIRST TERM

Wool Sorting, Scouring and Spin- ning	225	Textile Chemistry and Dyeing	60
Textile Design and Cloth Analysis	60	Machine Drawing	40
Power Weaving		Mechanical Engineering	45
			60

#### SECOND TERM

Wool Sorting	}			Mechanical Engineering	30
Worsted Spinning		142		Elements of Electricity	30
Textile Design and Cloth Analysis		60		Power Loom Weaving	97
Textile Chemistry and Dyeing		97		Machine Drawing	40

### THIRD YEAR

#### FIRST TERM

Wool Sorting	}			Power Loom Weaving	135
Worsted Spinning		195		Finishing	45
Textile Design and Cloth Analysis		60		Mill Engineering	15
Hand Looms		30		Electrical Engineering	30

#### SECOND TERM

Worsted Spinning	}			Power Loom Weaving	142
Wool Sorting		172		Finishing	45
Textile Design and Cloth Analysis		60		Mill Engineering	30
Thesis				Physical Laboratory	30

### COURSE III.—TEXTILE DESIGN

The general course in Textile Design covers a period of three years and is planned to meet the demand of young men for a technical training in the general processes of textile manufacturing, but with particular reference to the design and construction of fabrics. To this end a foundation is laid in the first year by instruction in mechanics, mechanical drawing, mathematics, chemistry and the elementary principles of designing and weaving. Two options are offered, namely, Cotton or Woolen and Worsted Spinning, and at the commencement of the second term the student should make his selection. At this time he begins his work in the yarn departments and pursues it until the end of the second year. The course in the yarn department is similar to that pursued by either Course I or II students, but is not carried to the same extent.

Throughout his entire course he receives instruction in design, cloth analysis and construction of all the standard cloths, viz.—trouserings, coatings, suitings, blankets, velvets, corduroys, plushes, etc. This leads into advanced work in Jacquard designing, being supplemented by work in the studio of the Decorative Art Department.

The course in Chemistry leads to Textile Chemistry and Dyeing in the second year and includes a short course in the Dyeing Laboratory.

Power Weaving commences with the second year and continues throughout the course.

The instruction in the Mechanical Department is carried along parallel with the other subjects of the course and includes steam, electricity and hydraulics. In the third year Mill Engineering is taken up and serves to show the application of the principles studied in the previous years. Mechanical Drawing extends throughout all three years and finds extensive application in the machine departments.

For detail description of the subjects, see pages 80-84



# COURSE III.—TEXTILE DESIGN

## FIRST YEAR

(For First Term see Page 63)

### SECOND TERM

	Hours of Exercise		Hours of Exercise
Textile Design and Cloth Analysis	60	Hand Looms	55
Elements of Mechanism	60	Trigonometry	30
General Chemistry	30	Textile Chemistry	15
Freehand Drawing and Decorative Art	52	Mechanical Drawing	67
Cotton or Woolen Spinning	105	Language (German or Spanish)	20

## SECOND YEAR

### FIRST TERM

Textile Design and Cloth Analysis	60	Mechanical Engineering (Steam, Physical Measurements, etc.)	45
Machine Drawing	40		
Textile Chemistry and Dyeing	60	Power Loom Weaving	60
Cotton or Woolen Spinning	225		

### SECOND TERM

Textile Design and Cloth Analysis	60	Elements of Electricity	30
Steam Engineering, Hydraulics, Physical Measurements	30	Machine Drawing	30
Textile Chemistry and Dyeing	97	Power Loom Weaving	97
		Cotton or Worsted Spinning	142

## THIRD YEAR

### FIRST TERM

Textile Design and Cloth Analysis	217	Mill Engineering	15
Hand Loom	30	Electrical Engineering	30
Power Loom Weaving	135	Finishing	45
Decorative Art			40

### SECOND TERM

Textile Design, Cloth Analysis	195	Mill Engineering	30
Power Loom Weaving	142	Finishing	45
Decorative Art	40	Physical Laboratory	30
Thesis			

## COURSE IV.—CHEMISTRY AND DYEING

The regular course in Chemistry and Dyeing extends through three entire school years, and is especially recommended to those who intend to enter upon any branch of textile coloring, bleaching, or the manufacture or sale of the various dyestuffs and chemicals used in the textile industry. The theory and practice of all branches of dyeing, printing, bleaching, scouring, etc., are taught by lecture work supplemented with a large amount of laboratory work.

During the first year General Chemistry, including both Inorganic and Organic, is taught by lectures and laboratory work, and this is supplemented during the second term by Qualitative Analysis and Stoichiometry. The lectures upon Textile Chemistry also begin during the first year.

Advanced Inorganic as well as Advanced Organic Chemistry are studied throughout the second year as a continuation of the Elementary Chemistry of the first year, but the majority of the time is spent upon Quantitative Analysis, Industrial Chemistry and Textile Chemistry and Dyeing.

The third year is devoted to Advanced Textile Chemistry and Dyeing, Quantitative Analysis, Industrial Chemistry, Physical Chemistry and Thesis work.

The work is taken up in a thorough manner and has been so arranged that the amount of time spent in the laboratories and in classroom work balance each other. Sufficient studies are taken in the other departments to broaden the knowledge of the student in regard to textile work in general, and he is given such training as the time will permit in mathematics, mechanics, mechanical drawing, modern languages and designing.

The student who conscientiously performs all of the prescribed laboratory work and the practice work should be proficient not only in dyeing and textile printing, but should be well trained in the methods of analysis and the testing of the various chemicals, mordants and dyestuffs so extensively used in the textile industry.

Students who have taken a thorough course in Chemistry in some technical school or college may, after satisfying those in charge of their proficiency to take advanced work, be admitted to the second year class, but in no case can any student, who has not previously made a special study of Textile Chemistry and Dyeing, complete the course in less than two years.

For detail description of subjects see pages 85-91

# COURSE IV.—CHEMISTRY AND DYEING.

## FIRST YEAR

(For First Term see Page 63)

### SECOND TERM

	Hours of Exercise		Hours of Exercise
Elementary Organic Chemistry	30	Cloth Analysis	30
Textile Chemistry	15	Elements of Mechanism	60
Stoichiometry	30	Mathematics	30
Qualitative Analysis	195	Mechanical Drawing	38
German			20

### OPTIONS :

Free Hand Drawing

Decorative Art

## SECOND YEAR

### FIRST TERM

Advanced Organic Chemistry	15	Dyeing Laboratory	150
Advanced Inorganic Chemistry	30	Mechanics	30
Industrial Chemistry	120	Quantitative Analysis	112
Textile Chemistry and Dyeing	30	Power Loom Weaving	30

### SECOND TERM

Advanced Organic Chemistry	30	Quantitative Analysis	150
Advanced Inorganic Chemistry	30	Mechanics	30
Textile Chemistry and Dyeing	30	Electricity	30
Dyeing Laboratory			210

### OPTIONS :

Designing

Advanced Mathematics

Power Loom Weaving

## THIRD YEAR

### FIRST TERM

Industrial Chemistry	68	Physical Chemistry	30
Advanced Textile Chemistry and Dyeing	30	Quantitative Analysis	135
Dyeing	30	Electricity	10
Dyeing Laboratory	157	Finishing	45

### SECOND TERM

Industrial Chemistry	30	Quantitative Analysis	98
Physical Chemistry	20	Woolen and Worsted Finishing	45
Advanced Textile Chemistry and Dyeing	20	Calico Printing and Cotton Finish	60
Dye Testing	60	ing	
		Thesis	

## Course VI. Textile Engineering.

The course in Textile Engineering is designed to equip the student to meet intelligently the engineering problems of the textile industry as well as to provide him with a knowledge of the processes and machines of its varied branches. The wide scope of this field provides abundant applications of the broad fundamental principles underlying all engineering work. The student is thoroughly grounded in these principles before attacking the more advanced and specialized problems.

The most important of the preliminary subjects are mathematics, physics, the elements of mechanics, mechanism and drawing. In addition to the prescribed courses in mechanics and drawing taken by all regular students, many of the advanced problems in applied mechanism are studied in detail both in the drawing room and laboratories. The work in physics is given with special reference to such problems as the physical testing of fibres, yarns and fabrics, hygrometry, etc.

A large amount of time is also spent in the drawing room and the practical uses of mechanical drawing are considered of first importance. Courses are also given in the elements of steam, electrical and hydraulic engineering, not with the aim of giving exhaustive instruction in the subject but rather to familiarize the student with the means, methods and results available in the modern practice of these branches. In connection with this work, the power plant of the school is available for boiler and engine testing as well as a variety of other experimental work.

The work in mill engineering covers a wide range of subjects, including mill construction with calculations and drawings, mill heating, lighting, fire protection and humidifying. Special importance is also attached to the arrangement of plants and machinery for economical production and the modern methods of generation, distribution and measurement of power. The data for all problems in this work are taken from actual conditions and the solutions are compared with those of some of our best known mill engineers.

Advanced mathematics and physics are required in all three years, and the instruction is supplemented with laboratory exercises that skill may be acquired in the manipulation of physical apparatus.

## COURSE VI. — TEXTILE ENGINEERING

### FIRST YEAR

*(For First Term see Page 63)*

#### SECOND TERM.

	Hours of Exercise		Hours of Exercise
Trigonometry	30	Elements of Mechanism	60
Machine Drawing	53	Chemistry (Elementary)	45
Physics	38	Designing (Elements)	60
Hand Looms	55	Laboratories (Wool or Cotton)	105
Free Hand Drawing	30	German	20

### SECOND YEAR

#### FIRST TERM

Analytical Geometry	30	Advanced Mechanism	60
Machine Drawing	75	Applied Mechanics	30
Properties of Saturated Steam,		Advanced Physics, Physical Meas-	
Steam Engines and Boilers	30	urements	45
Power Loom Weaving	60	Laboratories (Wool or Cotton)	60

#### SECOND TERM.

Analytical Geometry and Calculus	30	Advanced Mechanism with Draw-	
Machine Drawing	75	ing	60
Steam and Hydraulics	30	Applied Mechanics	30
Physical Laboratory	60	Electricity	30
Power Loom Weaving	60	Laboratories (Wool and Cotton)	120

### THIRD YEAR

#### FIRST TERM

Differential and Integral Calculus	30	Mill Engineering	30
Mill Engineering Drawing	90	Power Generation and Distribu-	
Physical Laboratory	45	tion and Applied Electricity	60
Laboratories (Wool or Cotton)			120

#### SECOND TERM

Differential and Integral Calculus	30	Mill Engineering Drawing	120
Power Generation and Distribution	60	Physical Laboratory	45
Laboratories (Wool and Cotton)	120	Thesis	

# Outline of Instruction

## Cotton Department

### Cotton Fibre

Lecture Course:

Ancient History.

Structure of Fibres.

Botanical Varieties—Their Classification and Characteristics.

Commercial Varieties, Classification, Characteristics and Adaptatives.

Methods of Cultivation.

Ginning—Roller and Saw Gins.

Baling—Various forms of Baling Presses and their products, characteristics of each.

Mixing—Per cent. grade, variety and color mixtures.

### Picking

Construction and operating of various machines used in the Picking process, and calculations connected with same.

Bale Breaker, Automatic Feed, Opener, Breaker, Intermediate and Finisher Pickers, Waste Openers, etc.

Cleaning Trunks, Evener Motions, Beaters, Regulation of Air Drafts, etc.

### Carding

Principles of Carding.

Construction and operation of various forms of Cards.

Top Flat Cards.

Revolving Flat Cards.

Card Clothing, Grinding, Setting, Drafts, Speed, Production and Calculations connected therewith.

Defects in operation and in quality and amount of production of the foregoing machinery and remedies.

Practical illustrations of principles taught and analysis of product.

### Drawing

Theory of Drawing.

Effect of Doublings.

Construction and operation of the Railway Head.

Evener Motions.

Stop Motions.

The Drawing Frame—Varieties and Details of Construction.



Stop Motions—Mechanical and Electrical, Rolls—Common and Metallic and peculiarities of each.

Roll Setting, Proportioning of Drafts, Condensing.

Operation, Adjustment and Care of Drawing Machinery.

Speeds, Drafts, Production and Calculations for each.

## **Roving Processes**

The development of the Fly Frames.

Mechanical construction and operation of the Slubber.

Intermediate, Fine and Jack Fly Frames, and features of each.

Explanation of Differential Motions, Builder Motions, Reverse Motions.

The functions and development of the Cones.

Draft, Twist, Tension, Lay and Taper regulation and the effect of each and calculations for same.

The Reeling, Weighing and Numbering of Roving.

Space, Traverse, and length of machines of the several Roving Processes.

Defects in Adjustment, Operation and Product of Roving Machinery, and the remedy for those defects.

Practical operation of the machinery illustrative of instruction given.

## **Spinning**

Classification of Yarns in regard to material, varieties, uses, twist, etc.

Reeling, Weighing and Numbering of single and ply Yarns.

Comparison of Throstle, Ring and Mule Spinning.

Construction and operation of Ring Spinning Frames.

Twist.—Amounts for warp, filling, hosiery yarns and ply yarns, hard and soft, regular and reverse.

Comparisons of single and double roving in Spinning.

Consideration of Spinning Frame details, Spindles, Rings, Separators.

Builders.—Warp, Filling and Combination.

Calculations for Speed, Drafts, Twists and Production.

Twisting and Fancy Yarns, Loop, Nub, Splash, etc.

## **Combing**

Consideration of the Combing operation and preparatory machines.

Sliver Lap Machine.

Ribbon Lapper.

Comber.—Construction, Operation, Settings, Timings, Adjustment, Per cent. of Noil.

Calculations in regard to Drafts, Speeds and Production.

Practical application of principles taught.

## **Mule Spinning**

The development of the Throstle, Spinning Jenney and Mule.

Construction and operation of the Mule.

Details of operation, Drawing, Twisting, Backing off, Winding, Re-engaging.

Details of construction.—Builder Motion, Quadrant, Roller Motion, Nosing Motions, Jacking Motion, etc.

Calculation in regard to Speeds, Draft, Twist, Drag and Production.

## **Organization**

Methods of handling Cotton Waste, Fine Yarn Spinning, Cost of Production.

Figuring of "Program" of Doublings and Drafts, throughout the entire yarn manufacturing process, for the production of different varieties and numbers of cotton yarns.

The economic arrangement of Machinery.

Calculations for Schedules of Machinery required for the production of different amounts of various yarns.

Powers required for various Machines etc.

List of machinery adapted for different purposes in Cotton Mill Work.

Layout of Machinery for different processes.

Knitting.

Construction and operation of Web Machines, Rib Machines, Loopers, in the production of plain hosiery.

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## **Woolen and Worsted Department**

### **Raw Materials**

Animal Fibres:—Wool, Silk, Mohair, Alpaca, Vicuna, Cashmere, Camel Hair, etc.

Vegetable Fibres:—Cotton, Flax, Hemp, Jute, Ramie.

Wool Substitutes:—Noil, Shoddy, Mungo, Extracts.

Waste Products manufactured on Woolen Machinery:—Cotton Waste, Linters, Flax, Hemp, and Jute Waste.

Sources of supply and relative values of above.

Chemical and Physical properties and Composition.

Microscopical examination.

### **Wool Fibre**

Physical and chemical structure—Difference between wool, hair and fur—

Physical properties, Strength, Elasticity, Curl, Lustre, etc.  
Felting Property—Hygroscopic Property.

Structure and cause of Kemps.

Definitions of trade terms:—Picklock, XXX, XX, 1-2 Blood, 3-8 Blood, 1-4 Blood, Delaine, Braid, etc.

Pulled Wools—Their uses and classification.

## **Wool Sorting**

Difference between Sorting and Grading.—Sorting and Blending.

Judging Spinning Qualities.

Estimating Shrinkage.

Definitions of trade terms—Cots, Hog, Shurled Hogget, Wether, Fribs, Paint, Stain, Shoulder, Cast, etc.

## **Wool Scouring**

Object of Wool Scouring.

Composition of Yolk and Suint.

Cholesterol and Lanolin.

Materials used as detergents.

Emulsion Process:—Use of Soda, Potash, Hard and Soft Soaps.

Manufacture of Scouring Soaps with tests for impurities.

Water in Wool Scouring with tests for hardness, etc.

Effect of heat on Wool Fibre with proper heat of scouring liquor.

Recovery of potash salts and wool fat from waste scouring liquor.

The Solvent process—Degreasing Wool, with Naphtha.

Construction and use of Scouring Machines and Rinse Boxes with Speeds, Adjustments and Productions.

Construction and use of Dryers, Table and Artificial.

Effect of heat on Lustre; proper heat for various classes of Wool:—  
(Braid, Botany, Mohair, etc.)

## **Carbonizing**

Object of Carbonizing.

Carbonizing Wool, Noils, Burr Waste, Rags, etc.

Carbonizing Agents:—Sulphuric Acid, Aluminum, Chloride, etc.

Hydrometers.

Strength of Carbonizing Agents.

Carbonizing with Acid Gases.

Neutralizing.

## **Burr Picking**

Object of Burr Picking—What wools are Burr Picked and why they are not carbonized.

Construction and Use of the several Kinds of Burr Pickers.

Adjustments, Speeds and Production of same.

## Mixing and Oiling

- Object of Mixing. Laying down lots
- Mixing Different colors of Wool.
- Mixing Wool with Cotton, Shoddy, Noils, etc.
- Object of Oiling—Discussion of various Kinds of Oils used, Olive, Lard, etc.
- Oil Testing, Viscosity, Flashing Point, etc.
- Manufacture of Emulsions.
- Construction and Use of Automatic Oilers, Feeds and Pickers.
- Speeds, Productions and Calculations for cost of Lots when materials of different values are used.

## Carding

- Principles of Carding.
- Functions of various parts:—Feed Rolls, Lickerins, Tumblers, Workers, Strippers, Cylinders, Fancies, Dickies, Doffers, etc.
- Construction of various parts.
- Direction of Revolution and Speeds.
- Card Clothing—Construction and uses of the various Kinds of Backing: Leather, Flexifort, etc.—The several Kinds of Wire:—Garnett, Metallic, Convex, Lickerin, etc.
- The “Counts and Crown” method of counting Card Clothing.
- Card Adjusting and the use of Card Sets.
- Clothing the Card.
- Card Grinding and Grinders, Solid Roll, Traverse, Screw and Chain.

## Woolen Cards

- Construction and use of the First Breaker, Second Breaker and Finisher.
- Various methods of coupling Cards.
- Card with Breast.
- Woolen Card Feeds.—Object, Construction, and use of Automatic Feeds for First Breaker, Bramwell, etc.
- The Construction and use of the several Kinds of Automatic Feeds for Second Breaker and Finisher, Apperly, Torrance Balling Head and Creel, Bates, Kemp, Scotch, etc.
- Condensers, Rub Roll, Combination, Double Apron, etc.
- Calculations for Proper Weight of Rovings, Speeds, Productions, etc.

SAMPLE CARDING.—Each Student is required to make at least twenty Sample Mixes combining different colors and grades of Stock and to Felt and Mount the same. Part of the Carding to be done by Hand Cards and part on the Torrance Sample Mixing Card.

## Woolen Mule

Principles of Spinning. History and development.

Hand Jack, Self-operating and Self Acting Mules. The Mule-head.

Methods of Driving the various parts, Rolls, Spindles, Carriages, etc.

Backing-off. Winding Mechanism.

Study of the Quadrant and Builder-rail. Regulation of the Fallers.

Double Spinning. Twisting on Mule and on Woolen Twister.

With the above lectures will be given all the necessary calculations and actual practice on the various machines.

## WORSTED

### Top Making

CARDING AND PREPARING — The principles of Worsted Carding—Types of Worsted Cards, Double Cylinder Lickerin, Breast etc.

Speeds, Settings, Feeds, Adjustments, Productions.

PREPARING— Differences between Carding and Preparing—What Wools are Prepared and why they are not Carded. The use of Emulsions. A Set of Preparers. The calculations for Drafts on any Gill Box. The Clough Gill Box.

The proper Drafts in Preparing—Adjustments, Speeds, Productions, Calculations, etc.

GILLING AFTER CARDING—Number of Doublings, etc.

COMBING—The principles, history and development of Worsted Comb-  
ing.

Combing on the Noble and Lister machines.

Calculations for Draft—Settings, Speeds, Productions, etc.

Per cents. of Noil.

GILLING AFTER COMBING — Proper Drafts and calculations for Doublings.

BACK WASHING—The object and nature of the process—Back-washing Liquors, Composition, Heat, etc.

The Hygroscopic property of Wool—Conditioning of Tops—Top Mixing.

### Open Drawing or Bradford System

The Principles of Drawing. Numbers of Operations for different Counts of yarn. The use of Logarithms in Drawing Calculations, Study of the Drag—Calculations for Drafts and Twists—Proper Ratch.

The functions of the Weigh Box.

Measuring Stop Motions, Candle Stick, Side Knock-off, etc.

Calculations for length.

Construction and use of Gauge Points or Constants.  
Effects of Doubling.  
The Dram and Hank Systems for numbering Roving.

### **Cone Drawing**

The object and use of Cone Drawing—Differential Motions, Builder Motions—Calculations for Draft—Twist-Tension and Lay—Adjustment, Speeds and Productions.

### **French Drawing**

The principles and use of French Drawing—Functions of the Porcupine. The principle of Condensing—Manufacture of Merino Yarns.

### **Spinning—English and French**

The Principles of Spinning. Calculations for Draft and Twist—Spinning on the Cap—Flyer and Ring Frames—The Scaife Builder Motion—Drag in Bradford System of Spinning—The use of Straight Conical and Bell Mouthed Caps. Top Roll, Single and Double Covered, Iron and Wood.

Types of Frames, Leicester and Illingworth; Speeds, Productions, etc.

Principles of Worsted Mule Spinning.

### **Twisting**

Principles of Twisting, Reeling, Weighing and Numbering of Single and Ply Yarns, Twisting on Cap, Flyer and Ring Frames—Calculations for Twist—Twist testing—Trap Twisters—Effect of direction of Twist; Speeds, Productions, Yarn Testing, etc.

The true difference between Woolen and Worsted Yarns. Layout of Machinery for different classes of Yarns—Power required for different machines—Cost of Machinery and approximate labor cost of each Department, Sorting, Scouring, Carbonizing, Picking, Carding, Combing, Drawing, Spinning, Twisting, etc., for various classes of Yarns, Carpet, Braid, Botany, etc.

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## **Designing Department**

### **GENERAL COURSE**

#### **First Year**

Options:—Cotton, Woolen and Worsted Yarns.

#### **Design Lectures**

Point or design paper.

Intersections, interlacings and cut sections.

Color effects.

Reeds and setts.

Different systems of counting reeds and yarns.



Twills and diagonals.  
Drafting and reduction.  
Sateen weaves.  
Cut weaves.  
Combination of weaves.  
Spot weaves.  
Plain fabrics and fabrics on a plain basis.  
Names and explanations of different parts of cloth.  
Terms applied to weaves, etc., etc.  
Classifications of fabrics.

### **Cloth Construction and Cloth Analysis**

Reproduction of fabrics, planning of patterns, drafts, chains, etc., etc., on paper, including yarn and cloth calculations as below:—

Relative sizes of yarns.  
Grading of woolen yarns.  
Woolen yarn calculations.  
Methods of finding weight of various lengths of fabrics.  
Calculations for finding sizes of yarns of various denominations.  
Worsted yarn calculations.  
Cotton yarn calculations.  
Calculations for folded or ply yarns.  
Calculations for converting one system of yarns into that of another.  
Calculations for finding weight, counts or length of warp or filling from given data.  
Calculations for reeds.

### **Practical Work**

Color effects.  
Combinations of colored threads.  
Combination of weaves.  
Figured designing on plain ground.  
Figured designing on twill ground.  
Cut Diamonds.  
Checkerboard effects.  
Herringbone stripes.  
Checked goods.  
Colored goods, stripes.  
Drafting of designs.  
Designing from chains and drafts.

Practical work on hand looms putting into operation the principles taught in the foregoing course, including dressing, beaming, drawing in and reeding of warps.

## Second Year

### Design Lectures

Twilling.  
Fancy twills.  
Point drafts.  
Double, triple and alternate drafts.  
Lined work.  
Damasks.  
Fancy stripes.  
Sateen stripes.  
Plain and irregular rib weaves.  
Oblique rib weaves.  
Basket weaves.  
Corkscrew and double twill weaves.  
Broken twills.  
Backed cloths, filling and warp.  
Double cloths.  
Multiple ply fabrics.  
Cloths ornamented with extra warp or filling  
Piques and Welts.  
Bedford cords.  
Marseilles quilting.  
Fancy woolen cassimeres  
Figured blankets.  
Crepes.  
Trouserings.  
Carriage robes.

### Cloth Construction and Cloth Analysis

Calculations for harness straight, centred or point.  
Calculations for shrinkage or contraction.  
Calculations to find the number of ends per inch in order to use a given weight of warp, also picks per inch to use a given weight of filling.  
Calculations on the proportioning of fabrics.  
Construction of cloth.  
Balance of cloth.  
Amount of material used in the construction of fabrics.  
Analysis consisting of cotton dress goods, ginghams, fancy dress goods, backed and double cloths.  
Calculations for complete specifications of backed and double cloths based upon the structure of cloth.

## **Practical Work**

Cloth analysis and reproduction of fabrics; planning patterns, drafts, chains, etc., on paper, including all necessary calculations for loom and finished cloth.

Analyses of fancy woolen and worsted cassimeres, woolen and worsted suitings, overcoatings, blankets, etc. Original designing on all design lectures.

## **Lectures on Color**

Color theory.

Color applied to textiles.

Color values.

Combination of colors.

Coloring of plaids and checks.

Coloring of suitings and trouserings.

Coloring of gingham and tartans.

Coloring of stripes.

## **Third Year**

### **Design Lectures**

Cotton velvets.

Corduroys.

Cotton pile fabrics, cut and uncut.

Figured Matelasse.

Shawls.

Cotton plushes.

Chinchilla.

Worsted and mohair mantle cloths.

Figured double plains.

Reversibles.

Ingrains.

Tapestries.

Cotton gauze.

Cotton leno.

Cotton lappet.

Jacquard designing.

Distribution of figures.

Determination of area occupied by figures.

Jacquard figures formed by the warp or filling.

Figures not square.

Cloth formed by the combination of Jacquard gauze, and fancy harness weaves.

Special designs for Jacquard gauze, and pile fabrics.

Jacquard pile and ordinary weaves.

Vestings.

Golfings.

The principles of designing, cloth structure and coloring best adapted to each of the above fabrics.

### **Cloth Construction and Cloth Analysis**

The structure and analysis of all descriptions of compound fabrics, viz:—backed, double, and various types of Jacquard figured fabrics, especially applicable to the cotton and worsted industries.

The cost of mixing and blends.

The cost of ply yarns.

The Metric system.

Calculations for woolen and worsted including the various processes of scouring, fulling and finishing.

### **Practical Work**

Original designs on the foregoing lectures.

The complete analysis of a fabric.

Practical work on hand looms and putting into operation the principles taught in the foregoing course.

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## **Decorative Art Department**

As a knowledge of the principles of design decoration and color is necessary to the success of the textile industry, the Department of Decorative Art has been formed to fill this need and is included in the regular course.

One year course for all students—

Lecture on Historical Ornaments, Design and Color.

Practice in Freehand Drawing, Lettering, Design and Color.

Lecture on Historical Ornament will include Egyptian, Greek, Roman, Byzantine, Saracenic, Gothic, and Renaissance Styles. These lectures will be illustrated with the stereopticon.

The principles of design will be taught and practice will be given in applying these to problems.

The anatomy of pattern and the geometric basis of repeated design and the application of color will be included in this work.

Second year students taking design will be given advanced work on these same subjects.

Special class in drawing, painting and design for students not taking the other courses of the school.

This class is to provide instruction for students wishing to fit themselves to design textiles, wall-paper, book covers, leaded glass, silver, furniture, etc.

Also for those wishing to learn drawing and painting, either to become illustrators, portrait painters or decorators.

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## **Chemistry and Dyeing Department**

### ***ELEMENTARY CHEMISTRY***

This subject is required not only of the students taking the regular course in Chemistry and Dyeing, but by all others intending to take a complete course and receive the school diploma.

It will include lectures, recitations, and a large amount of individual laboratory work upon the following subjects, and will extend through one entire year:—

#### **Chemical Philosophy**

Chemical action, chemical combination, combining weights, atomic weights, chemical equations, acids, bases, salts, Avogadro's law, molecular weights, formulas, valence, periodic law, etc.

#### **Non-Metallic Elements**

Study of their occurrence, properties, metallurgy, chemical compounds, etc.

#### **Metallic Elements**

Study of their occurrence, properties, metallurgy, chemical compounds, etc.

#### **The Hydrocarbons and their Derivatives**

Study of their occurrence, properties, preparation, uses, etc. This work although elementary in character is of sufficient breadth to prepare the student understandingly for the work with the artificial dyestuffs which follows.

#### **Qualitative Analysis**

Before the completion of the course, the student will take up as thoroughly as the time will permit, the qualitative detection of the more common metals and non-metals, with practical work.

### **QUALITATIVE ANALYSIS**

Qualitative Analysis will be studied by all regular students in Course IV during the second term of the first year. The work will be based upon Prescott and Johnson's Qualitative Chemical Analysis and will consist of one lecture, one recitation, and not less than twelve hours laboratory work per week. The student must become familiar with the separations and the detections of the common metals and acids by the analysis of a satisfactory number of solutions, salts, alloys, pigments, etc. At intervals during the term, short laboratory tests will be given as well as the regular written examinations.

No pains will be spared to make the course as valuable to the student as possible and to encourage only thorough and intelligent work.

Students taking Course IV, when sufficiently advanced, will take up the examination of various products with which the textile chemist must be familiar, such as testing mordanted cloths, pigments, and the various dyeing reagents.

During the latter part of this course a certain amount of time will be devoted to the preliminary operations of Qualitative Analysis, such as the precipitation and washing of such substances as barium sulphate, magnesium ammonium phosphate, calcium oxalate, etc., although no weighings or actual determinations will be made.

A student's marks in this subject will depend as much upon the neatness and care used in manipulation as upon the actual results obtained.

### **STOICHIOMETRY**

This subject will be taken up by the Chemistry and Dyeing student during the second half of the first year.

The application of the metric system will be thoroughly taken up, and problems will be worked by the student involving the expansion and contraction of gases, determination of empirical formulae, combining volume of gases, quantitative analysis, etc.

### **ADVANCED INORGANIC CHEMISTRY**

The whole subject of Inorganic Chemistry will be reviewed during the second year, and many advanced topics will be introduced which were necessarily omitted from the first year course in General Chemistry.

### **ADVANCED ORGANIC CHEMISTRY**

The course will consist of lectures and recitations extending through the second year. The principle of organic substitution and synthesis will be thoroughly discussed using as many illustrations as the time will permit, particularly such as are applied in the arts. The alliphatic series of hydrocarbons and their derivatives will be studied for about twenty



weeks of the year, the remainder of the time being devoted to the benzene series. The aim of the course is to lay a broad foundation for the chemistry of the artificial dyestuffs, which is studied in the third year. Students are required to work out problems in the synthesis of various compounds in order to get familiarized with equation writing.

#### **PHYSICAL CHEMISTRY**

This subject will be studied during the third year.

It will include the principles of calorimetry, specific heat, vapor density, the various methods of determining molecular weights, laws of solution, electrolytic dissociation, theories of precipitation, thermo-chemistry, surface tension, etc. The student will be required to work out a large number of problems introduced by the subject.

#### **QUANTITATIVE ANALYSIS**

This subject will be taken up by all regular Chemistry and Dyeing students, and extends through the second and third years of the course.

During the second year, the principles of analytical work are thoroughly taught, the work being based on Talbot's Quantitative Chemical Analysis. Gravimetric analysis is studied during the first term, and volumetric analysis during the second term. The samples analyzed include salts, ores, minerals, bleaching powder and alkalis. Frequent recitations are held for the discussion of methods and the solution of stoichiometrical problems. Students are encouraged to read the standard works and magazines on chemical subjects, in order to cultivate broad views of the science.

The third year work involves the analysis of water, alum, ammonia, soaps, coal, indigo, tannin, and the ultimate analysis of organic compounds, as well as the examination of such substances as starches, gums, and other thickeners, detection of adulterants, etc.

No pains will be spared to give the students the benefits of all the latest researches along the lines of industrial analytical methods, and original work is encouraged in all.

#### **TEXTILE CHEMISTRY AND DYEING**

Under this head is included first, the lecture course in Textile Chemistry and Dyeing, which is taken by all regular diploma students; second, the general laboratory course taken by all regular diploma students, except those taking Course IV, and the laboratory and practical work course which will be taken by the regular Chemistry and Dyeing or Course IV students.

## OUTLINE OF LECTURE COURSE

### **Technology of Vegetable Fibres**

Cotton, Linen, Jute, Hemp, China Grass, etc. Chemical and physical properties, chemical composition, microscopical study, action of chemicals, acids, alkalies, heat, etc.

### **Technology of Animal Fibres**

Wool, Mohair, Silk, etc. Chemical and physical properties, chemical composition, microscopical study, action of chemicals, acids, alkalies, heat, etc.

### **Operations Preliminary to Dyeing**

Bleaching of cotton and linen, wool scouring, bleaching, fulling and felting of wool, carbolizing, silk scouring and bleaching, action of soap.

### **Water and its Application in the Textile Industry**

Impurities present, the methods of their detection, their effect during different operations, and methods for their removal or correction.

### **Mordants and Other Chemical Compounds used in Textile Coloring not Classified as Dyestuffs**

Theory of mordants, their chemical properties and their application, aluminum mordants, iron mordants, tin mordants, chromium mordants, organic mordants, tannin materials, sulphated oil, fixing agents, levelling agents, assistants, etc.

### **Theory of Dyeing**

Chemical, mechanical, solution, etc.

### **Natural Coloring Matters**

Origin properties, application of indigo, logwood, catechu or cutch, Brazil wood, cochineal, fustic, tumeric, madder, quercitron bark, Persian berries, etc.

### **Artificial Coloring Matter**

General discussion of their history, nature, source, methods of manufacture, methods of classification, and their application to all fibres.  
Special study of:—

Basic Coloring Matters.

Phthalic Anhydride Colors, including the eosins, phloxines, etc.

Acid Dyestuffs.  
Direct Cotton Colors.  
Sulphur Colors.  
Mordant Acid Colors.  
Insoluble Acid Colors, developed on the fibre.  
Alizarine Colors, including other artificial coloring matter requiring a metallic mordant.  
Reduction Vat Colors.  
Artificial Indigo—Indanthrene and Flavanthrene.  
Aniline Black and other artificial dyestuffs not coming under the above heads.

### **Machinery used in Dyeing**

A certain amount of time will be devoted to the description of the machinery used in the various processes of textile coloring and this will be supplemented as far as possible by the use of charts, diagrams, lantern slides, etc.

### **OUTLINE OF LABORATORY AND PRACTICAL WORK**

Besides lectures and recitations upon this subject, those taking the regular day course in Chemistry and Dyeing will be required to do at least fifteen hours per week of practical laboratory work. By the performance of careful and systematic experiments the student will learn the nature of the various dyestuffs and mordants, their coloring properties, their action under various circumstances and the conditions under which they give the best results. The more representative dyestuffs of each class will be applied to cotton, wool and silk, and each student will be obliged to enter in an especially arranged sample book, a specimen of each of his dye trials with full particulars as to the conditions of experiment, percentage of compounds used, time, temperature of dye bath, etc.

For convenience and economy most of the dye trials will be made upon small skeins of swatches of the required material, but from time to time students will be required to dye larger quantities, in the full sized dyeing machines which are described elsewhere

By the use of a small printing machine the principles of calico printing are illustrated, and with the introduction of dyeing machines, vats, etc., the practical side of the subject will be studied, and it will be a constant endeavor of those in charge, to impart such information of a theoretical and scientific character as will be of value in the operation of a dyehouse.

## **ADVANCED TEXTILE CHEMISTRY AND DYEING**

This is a continuation of the Textile Chemistry and Dyeing of the second year and includes a review of the second year's work in this subject, with the introduction of many advanced considerations, and in addition, the following subjects:—

### **Classification and Constitution of Artificial Dyestuffs**

A study from a more advanced standpoint of the classification and constitution of the artificial dyestuffs, including the various methods used in their production, also the orientation of the various groups which are characteristic of these compounds, and their effect on the tinctorial power of dyestuffs.

### **Color Matching and Color Combining**

A study of that portion of physics which deals with color, and the many color phenomena of interest to the textile colorist. The lecture work is supplemented with the practical application of the spectroscope and tintometer, and much practice in the matching of dyed samples of textile material.

### **Dye Testing**

The testing of a number of dyestuffs to all the common color destroying agencies, the determination of their characteristic properties and their action towards the different fibers. Also the determination of the actual money value and coloring of dyestuffs in terms of a known standard.

### **Union Dyeing**

A study of the principles involved in the dyeing of cotton and wool, cotton and silk, and silk and wool union material with the product of solid and multi-colored effects.

### **Textile Printing**

A thorough study of the whole subject of textile printing, each student being required to individually produce no less than twenty different prints including ten different styles of printing.

### **Cotton Finishing**

A study of the various processes of finishing cotton cloth, and the different materials used therein.

## Mill Visits

During the third year, visits will be made to some of the large dye-houses, bleacheries and printworks in the vicinity.

## INDUSTRIAL CHEMISTRY

Special attention has been given to this course, as it is considered extremely important in the study of chemistry in general, and of textile chemistry in particular. During the second year considerable time is spent in the laboratory in the actual manufacture of the chemical compounds used in textile work, from raw materials. Each student is required to make careful record of all of the crude material used, as a starting point, and to carry the various processes through as carefully as possible with the view of producing as great and pure a yield of the substances as possible.

Industrial Chemistry involves the application of both inorganic and organic chemistry and analytical work as well, for the purity of the compounds produced must be tested after the completion of their manufacture.

During the whole of the third year, lectures and recitations are held in Industrial Chemistry, particular attention being paid to those subjects which are of especial interest to the textile chemist, as oils, soaps, gas and coal tar industry, building materials and the manufacture on a large scale of the important chemical compounds, such as the common acids and alkalies, bleaching powder, various mordants, etc. The course will be illustrated as far as possible with specimens, diagrams and charts, and the students will be given an opportunity to visit the industrial establishments in the vicinity of Lowell and Boston.

## MICROSCOPY

The value of the microscope in the detection and examination of the various fibres cannot be over-estimated, and often facts may be discovered, and conclusions drawn, which could be arrived at in no other way.

The students in this course will be given as much work with the microscope as time will permit. They will receive instruction in the use of the high grade microscopes, and will not only have practice in the examination and detection of the fibres, but will be required to become proficient in the preparation of permanent slides.

## Power Weaving Department

- The process of making pattern warps.
- The construction and use of Spooling and Quilling Machinery for wool and cotton.
- The construction and use of Warpers of various kinds.
- Long and short chain systems of preparing warps and filling.
- Sizing materials and size mixing machinery.
- The Woolen Sizing Machine.                      The Woolen Beamer.
- Drawing-in and Twisting.
- Operation of machines named above, and warp preparation in cotton, woolen and worsted, timed to correspond with the respective lecture.
- The plain power loom and its construction.
- Shedding by cams.
- Various pickers and picking motions.
- Force of lay.
- Take up and let-off motions.
- Minor adjustments of the power loom.
- Plain looms as altered for weaving fancy cloth.
- Looms constructed for several shuttles.
- Drop box motions.
- Variety of cams for different grades of work.
- Principles of Beating-up motion.
- Adjusting lag to various grades of cloth.
- Different makes of box motions, applied to gingham weaving.
- Chain building for box looms.
- Shuttle changing looms.
- Shedding motions.
- Double acting dobbies.
- Chain building for dobbies.
- Fan reeds.
- Handkerchief motions.
- Leno weaving.
- Centre selvedge motions.
- Automatic looms.
- Filling changing looms.
- Single acting dobbies.
- Spring boxes and other motions for returning harness.
- Oscillating reeds.
- Lappet motions.
- Various shaker motions.
- Towel and other pile cloth weaving.
- Open and close shed looms, for weaving various grades of woolen and worsted cloths.



Equal and unequal gear driven looms.  
Lectures on Jacquard machinery.  
Single lift Jacquards.  
Double lift Jacquards.  
Leno Jacquards.  
Jacquards specially arranged for ingrain carpet work.  
Tying up Jacquard harness.  
Tapestry weaving, quilt weaving, etc.  
Weave room engineering and equipment.  
Cost of weave mill operation and statistics of operation.

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### **Finishing Department**

Examination of cloth from the loom. Perching, Knotting, Burling, Mending, etc.  
Preparation of cloth for the Fulling Mill.  
Flocking and its purpose.  
Construction and use of the Soaping Machine.  
Use of soaps and alkalies for fulling and scouring purposes.  
Construction and use of various types of Fulling Mills and Stocks.  
Theory and method of fulling various classes of goods.  
Construction and use of various types of Washing Machines.  
Theory and method of scouring cloth before and after fulling.  
Cloth Carbonization.  
Hydro Extractors and their use.  
Construction and use of various types of Napping Machines.  
Construction of various types of Gigs.  
Crabbing and Singeing.  
Construction and use of various Starching and Water Proofing apparatus.  
Construction and use of various types of Tenting and Drying Machines.  
Construction of Single and Double Shears.  
Grinding and Setting Shears.  
Construction and use of the Steam Brush.  
Construction and use of Plate and Roller Presses.  
Method of finishing various classes of Woollen and Worsted goods.  
Cloth Examining, Measuring, Weighing, Ticketing, Numbering, Rolling, Baling, Casing, and Shipping.  
Construction and use of the various machines necessary for this purpose.  
Testing apparatus, etc.  
All the necessary calculations for the various processes of finishing all classes of goods.

## **Engineering Department**

### **Mechanics and Mechanism**

Elements of Mechanics.  
Force, Work, Power and Energy.  
Measurement of Work and Power.  
Levers, Toggle Joints, etc.  
Windlass, Pulley Blocks.  
Inclined Plane and Wedge Screws.  
Worm and Wheel.  
Elements of Mechanism.  
Angular Velocity.  
Speed Problems.  
Rolling Cylinders and Cones.  
Gearing, Pitch of Gears.  
Belting problems.  
Link motions.  
Harmonic motions.  
Cam Design.  
Builder motions.  
Mangle Wheel.  
Aggregate Combinations.  
Epicyclic Trains.  
Different Motions.  
Graphic Statics.

### **Applied Mechanics**

Strength of Materials.  
Methods of Testing.  
Trusses, Beams, Columns.

In the above topics will be included as many problems as possible, dealing with the construction and maintenance of mills, not with the purpose of educating mill engineers, but rather to familiarize the student with the means at hand and processes employed in erecting structures for manufacturing, that they may study their government advantageously.

### **Steam and Hydraulics**

	Water.	Steam.	Gas.
Motive Powers.			
Water.			
Head and Pressure.			
Measurement of Quantity.			
Measurement of Power.			
Dams, Canals, etc.			

Types of Turbines.

Governors.

Steam.

Elements of Thermodynamics as applied to Steam.

Types of Boilers.

Fuels and Combustion.

Chimneys and Mechanical Draft.

Mechanical Stokers.

Coal Consumption.

Boiler Test.

Steam Engine.

Simple, Compound and Triple Expansion.

Condensers and Condensing engines.

Plain side valve.

Corliss and Cam Gears.

Governors.

Steam Turbines.

Use of exhaust steam for heating and dye house purposes.

Indicator.

Construction of and use in measuring power and setting valves.

Engine test.

Practical use of indicator and computation of indicator diagrams.

Gas.

Theory and general principles of gas engines.

Types of explosion and internal combustion engines.

Governing devices Throttling and Hit and Miss Type. Igniting devices.

Consumption of gas and costs.

### **Elementary and Applied Electricity**

Elementary Electricity.

Magnetism.

Electrical Measuring Instruments.

Dynamo Electric Machines.

Electric Lamps.

Principles of Alternating Currents.

Alternating Current Apparatus.

Electrical Power Transmission.

Electrical Testing.

In addition to the lectures and recitations in physics, electricity and steam engineering all regular students in the Textile Engineering course will have laboratory practice in the testing of fibres, yarns and fabrics and practical tests on steam and gas engines, motors, generators, etc. They will also spend additional time on advanced mechanism and machine drawing problems in the drawing room

### **MILL ENGINEERING**

Mill Construction. Calculations and drawings of modern mill buildings.

Distribution of power and methods of driving machinery.

Mill Fire Protection.

Mill Heating and Ventilation.

Mill Humidifying.

Several courses of lectures on allied subjects by outside lecturers will be added.

### **MECHANICAL AND MACHINE DRAWING**

Care and use of Instruments.

Geometrical Constructions.

Elements of Projections.

Isometric Drawings.

Sketching from machine details.

Working Drawings.

Tracings.

Blue Print Process.

Mechanism problems. Drawing in connection with course in Mechanism, such as cams, gearing problems and other mechanism designs.

Practical sketching from machines for working detail and assembly drawings.

The regular day students in Textile Engineering will spend a large amount of time in the drawing room on practical mill engineering problems, including construction drawings, machinery layouts, power transmission, etc.

## **EVENING CLASSES**

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The courses of instruction offered in the evening are similar to those of the day; but less time is devoted to the machine or laboratory work, since, in most cases this is of small moment; ordinarily the handling of the machinery is a part familiar to most of the students through contact with it in the day time, and in such cases the explanations and calculations are of the greater importance. In some cases it is possible to pursue two courses together, but this depends always on the arrangement of the schedule for any particular year.

The evening courses are free to graduates of the Evening High and Drawing Schools, operatives of the mills and machine shops, and other residents of Lowell, to such numbers as may be accommodated in the order in which they are received. Applicants must present proper credentials or pass entrance examination.

Graduates of grammar or higher schools, will be received on presentation of proper credentials; for all others, examinations will be held on the third Thursday in September, at 7 p. m. at the School. The candidates must be familiar with the English language, and the principles of arithmetic; for the first part, a short composition must be written on a given theme, and a certain amount must be written from dictation, while in the latter will be included addition, decimals, fractions, percentage, ratio and proportion.

### **Subjects**

The list of subjects embraced in each course is similar to that of the day and may be found beginning at page 74

### **Certificate**

With the honorable and satisfactory completion of either of the regular evening courses in any subject, the certificate of the School will be awarded.

**Course I, Cotton Spinning—2 Years**

**Course II (a), Woolen Spinning—1 Year**

**Course II (b), Worsted Spinning—2 Years**

**Course III, Designing.—3 Years**

**Course IV, Chemistry and Dyeing.—4 Years**

**Course V, Cotton Weaving.—1 Year**

**Course V (b), Woolen and Worsted Weaving.—1 Year**

**Course V (c), Dobbies and Jacquard.—1 Year**

**Course VI, Mechanics and Electricity—3 Years**

**Course VII, Finishing.—1 Year**

## Fees

Fee for each course for all except residents of Lowell is \$5.00 per year. All students, whether from Lowell or not, taking the Chemistry and Dyeing Course, will be required to make a deposit of \$5.00 at the commencement of the course. This is to cover the cost of laboratory breakages, and at the end of the year any unexpended balance will be returned or an extra charge will be made for the excess breakage.

## General

The schedule showing the arrangements of classes for each term will be announced at the opening of each term.

## SCHOOL ADMINISTRATION

CHARLES H. EAMES, S.B., Secretary of School.

## INSTRUCTORS

### TEXTILE ENGINEERING.

GEORGE H. PERKINS, S.B., chief instructor in mechanics and mechanical engineering. Massachusetts Institute of Technology, 1899. Experience: draftsman, Ludlow Manufacturing Company.

CHARLES H. EAMES, S.B., instructor in electrical engineering and mathematics. Is the secretary of the school. Massachusetts Institute of Technology, 1897. Experience: superintendent, Light, Heat and Power Company, Lowell, and engineer with Stone & Webster, electrical engineers, Boston, Mass.

GEORGE E. MARSH, S.B., instructor in mathematics, physics and electrical engineering. Massachusetts Institute of Technology, 1902. Experience: research department of General Electric Company; instructor in mathematics and physics, Adrian College; instructor in mathematics and physics, Case School Applied Science, Cleveland.

### CHEMISTRY AND DYEING

LOUIS A. OLNEY, A.C., chief instructor. Lehigh University, 1896. Experience: instructor, Brown University.

G. CARL SPENCER, S.B., instructor in chemistry. Worcester Polytechnic Institute, 1897.

JOHN B. REED, A.B., instructor in chemistry. University of Michigan, 1903. Experience: instructor in chemistry, University of Maine, two years.



HERBERT F. SCHWARZ, instructor in dyeing. University of Dublin. Associate of Royal College of Science for Ireland. Experience: with Leviinstein & Co., dye stuffs and chemicals, Manchester, Eng.

RUSSELL W. HOOK, assistant instructor in dyeing. Lowell Textile School, 1905.

#### DECORATIVE ART

IDA A. WOODIES, instructor. Lowell Textile School, 1900. Pupil of Dr. Denman W. Ross, lecturer in design, Harvard University.

#### DESIGN

FENWICK UMPLEBY, chief instructor. Honors, graduate textile department, Victoria College, Leeds, Eng., 1884. Experience: chief designer, Gilbert Manufacturing Company, Massachusetts, and Globe Worsted Mills, New York.

ARTHUR F. FERGUSON, instructor. Lowell Textile School, 1903. Experience: Chapman, Kendal & Daniels, wholesale dry goods Boston, Mass.

STEWART MACKAY, assistant instructor in hand loom weaving. Lowell Textile School, 1906.

#### COTTON YARN

STEPHEN E. SMITH, chief instructor. Lowell Textile School, 1900. Experience: draftsman, Lowell Machine Shop, and at Atlantic Cotton Mills and Shaw Stocking Company.

ARTHUR L. WILLEY, instructor. Experience: overseer, principally in carding, eight years at Palmer, Moosup, Samoset and New England cotton yarn companies.

#### WOOLEN AND WORSTED YARN

EDGAR H. BARKER, chief instructor. Massachusetts Institute of Technology, 1896. Experience: Pacific Mills, five years; E. Frank Lewis, wool scourer, one year.

JOHN N. HOWKER, instructor in wool sorting and scouring. Technical School of Saltaire, near Bradford, Eng. Certificate from City and Guilds of London. Experience: Saltaire Mills, Yorkshire, Eng.; Goodall Worsted Company, Sanford, Me.; Arlington Mills, Lawrence.

HENRY B. ARUNDALE, assistant instructor. Lowell Textile School, 1905.

#### WARP PREPARATION AND POWER WEAVING

WILLIAM NELSON, chief instructor. Harris Institute, Preston, Eng., 1887. Certificate of City and Guilds Institute, London, Eng. Experience: Springfield and Alexandria Mills, Preston, Eng.; overseer, jacquard weaving, North Manufacturing Company, Chorley, Eng.; and Ponemah Mills, Taftville, Conn.

JOSEPH WILMOT, instructor. Experience: loom fixer, U. S. Bunting Company.

#### FINISHING

ARTHUR A. STEWART, chief instructor. Lachine Academy, Canada. Lowell Textile School, 1900. Experience: Dominion Woolen Manufacturing Company, Montreal, Canada; Bay State, American Woolen and Nonantum manufacturing companies.

#### COMMERCIAL LANGUAGES

PAUL E. KUNZER, Ph.D., chief instructor. New England College of Languages, Boston.

# Register of Day Students,

1905 - 1906

## Third Year

Name	Course	Address
Avery, Charles H.	II	Newtonville, Mass.
Bradford, Roy H.	II	Lowell, "
Brookhouse, Albert L.	IV	Salem, "
Cheney, Harold W.	III	Clinton, "
Church, Charles R.	II	Lowell, "
Churchill, Charles W.	III	" "
Cole, Edward E.	IV	Haverhill, "
Currier, Herbert A.	I	Somerville, "
Curtis, Frank M.	I	Roxbury, "
Donnellan, Frank T.	III	Lowell, "
Fleming, Frank E.	IV	" "
Gahn, George L.	II	Jamaica Plain, "
Gillon, Sadie A.	IIIb	Lowell, "
Hadley, Walter E.	IV	" "
Hennigan, Arthur J.	II	Dorchester, "
Hildreth, Harold W.	II	Westford, "
Hintze, Thomas F.	I	Syracuse, N. Y.
Kent, Clarence L.	III	Lawrence, Mass.
Lane, John W.	I	Wakefield, "
Mackay, Stewart,	III	North Chelmsford, "
McDonnell, William H.	I	South Boston, "
Newcomb, Guy H.	IV	Fitchburg, "
Reynolds, Isabel H.	Sp. III	North Andover, "
Stohn, Alexander C.	III	Roslindale, "
Swan, Guy C.	II	Lawrence, "
Varnum, Arthur C.	II	Lowell, "
Wightman, William H.	IV	Lawrence, "
Wood, Herbert C.	I	Lowell, "
Woodruff, Charles B.	I	Boston, "

## Second Year.

Name	Course	Address
Bain, William A.	IV	Sabattus, Maine.
Barron, Christopher T.	VI	Lawrence, Mass.
Bayard, Pierre P.	I	Paris, France.
Bicknell, Karl A.	IV	Lowell, Mass.
Brownell, Perry R.	II	Fitchburg, "
Coman, James G.	I	Iuka, Miss.
Craig, Albert W.	IV	Lawrence, Mass.
Dearing, Melville C.	IV	Haverhill, "
Eames, Alden N.	IV	Wilmington, "
Ehrenfried, Jacob B.	II	Boston, "
Ellis, George W.	IV	Monson, "
Farmer, Chester J.	IV	Andover, Mass.
Fowler, Alma E.	IIIb	Lowell, "
Grant, Harold.	II	Worcester, "
Haskell, Spencer H.	II	" "
Hathorn, George W.	IV	North Andover, "

Name	Course	Address
Hayes, Ralph H.	IV	Dover, N. H.
Hoyt, Charles W. H.	IV	Lowell, Mass.
Huntington, Fred W.	IV	Montpelier, Vt.
Hylan, John B.	II	Lowell, Mass.
Kinne, Roy W.	I	Housatonic, "
Knowland, Daniel P.	IV	Marblehead, "
Lee, Frank H.	IV	Lawrence, "
Mayo, George E.	II	Foxcroft, Maine.
Meek, Lotta	IIIb	Lowell, Mass.
Merriman, Earl C.	II	Shirley, "
Opitz, Charles H.	I	North Adams, "
Possner, Albert W.	II	Edgewood, R. I.
Raymond, Charles A.	IV	Essex, Mass.
Robertson, Norval	IV	Lowell, "
Shea, Daniel J., Jr.	IV	Fitchburg, "
Simola, Emil J.	Sp. II	Finland.
Southgate, Herbert R.	II	Worcester, Mass.
Storer, Francis E.	II	W. Roxbury, "
Stott, Charles H.	IV	Lawrence, "
Stursberg, Paul W.	II	New York City.
Taylor, Harry C.	IV	Lowell, Mass.
Walker, William, Jr.,	II	North Hartland, Vt.
Wilson, Ralph A.	VI	Lowell, Mass.
Woodcock, Eugene C.	II	Lawrence, "

### First Year.

Name	Course	Address
Abbott, George R.	II	Andover, Mass.
Bajus, Helen	IIIb	Vancouver, B. C.
Baker, Harold H.	I	Batesville, S. C.
Ballard, Horace W. C. S.	IV	Marblehead, Mass.
Barlow, Richard E.	IV	Lawrence, "
Battis, Floyd S.	IV	East Boston, "
Bemis, Fred S.	Sp.	Billerica, "
Bonan, Leo F.	III	Lowell, "
Briggs, Howard F.	II	Dracut, "
Campos, Guy J.	III	Lowell, "
Delano, James	III	New Bedford, "
Dwight, John F., Jr.	III	Dorchester, "
Ellis, Dwight W.	II	Monson, "
Farr, Leonard S.	II	Holyoke, "
Field, Osmond F.	VI	Lowell, Mass.
Foster, Lloyd G.	III	Boston, "
Fullerton, MacArthur M.	IV	Andover, "
Gay, Olin D.	II	Cavendish, Vt.
Huising, Geronimo	I	Jaro, Iloilo, P. I.
Jenckes, Leland A.	VI	Dorchester, Mass.
Lewis, LeRoy C.	IV	North Woburn, "
Lowell, James E.	II	Worcester, "
Mailey, Howard T.	II	Lynn, "
Mason, Archibald L.	VI	Billerica, "
Morton, Howard N.	VI	Lowell, "
Musgrave, Albert F.	IV	Utica, N. Y.
O'Riordan, Andrew	VI	Lowell, Mass.
O'Sullivan, Bartholomew B.	IV	Andover, "

Name	Course	Address
Parker, Clarence A.	III	Lowell, Mass.
Parker, Herbert L.	VI	" "
Perkins, Joshua D.	III	East Bridgewater, "
Prince, Sylvanus C.	VI	Lowell, "
Proctor, Braman	II	Wrentham, "
Read, Paul A.	I	New Boston, N. H.
Reilly, Thomas W.	I	Taunton, Mass.
Reynolds, Fred B.	II	North Andover, "
Robinson, Ernest W.	IV	Haverhill, "
Russell, Edwin F.	VI	Methuen, "
Sargent, James M.	VI	Lowell, "
Shenton, Charles M.	VI	Nashua, N. H.
Squires, John N.	III	Englewood, N. J.
Stowell, Joe S.	I	Lowell, Mass.
Strauss, Leon	III	Boston, "
Thompson, Willis	I	Baltimore, Md.
Weeks, Lauris A.	III	Rochester, N. H.
Weinz, William E.	IV	Roxbury, Mass.
White, Charles B.	II	Andover, "
Whittier, Bessie	IIIb	West Boxford, "
Wiggin, Leon M.	III	Lowell, "
Wingate, William H.	IV	Lawrence, "
Winslow, Walter C.	IV	Ayer, "

### First Year.

#### SPECIAL ART CLASS.

Burrage, Katherine,	Lowell, Mass.
Carr, Harry R.	" "
Carroll, Frank D.	" "
Clements, George B.	" "
Cornock, Emily A.	" "
Cunningham, Albert A.	" "
Egan, Charles H.	" "
Gienandt, Fritz G.	" "
Goyette, Thomas J.	" "
Grindle, Frank A.	" "
Haley, Florence S.	Tewksbury, "
Hanson, John C.	Lowell, "
Hill, Fred A.	" "
Kelley, Arthur D.	" "
Mason, Paul E.	" "
McMenamin, Frank	" "
Merchant, Edith C.	" "
Paquette, Don	" "
Prince, Calvin F.	North Chelmsford, Mass.
Quinn, Joseph	Lowell, "
Roche, Essie E.	" "
Roche, Lilla E.	" "
Roussell, Henry	" "
Scott, Edward	" "
Shea, Henry	" "
Smith, Avis F.	" "
Sturm, Wolfgang	" "
Sullivan, Joseph T.	" "
Whitney, Elizabeth	" "

# Register of Evening Students,

1905 - 1906

## Fourth Year.

Name	Course	Address
Bagshaw, Arthur H.	IV	Lowell, Mass.
Bake, Herbert	III	Lawrence, Mass.
Brown, James P.	III	Lowell, "
Dick, Hugo P.	III	Lawrence, "
Dimlick, Benjamin C.	III	" "
Eyers, John T.	IV	Lowell, "
Frank, Emil M.	III	Lawrence, "
Kidd, Thomas E.	IV	Lowell, "
Molloy, Andrew	III	" "
O'Brien, David A.	IV	" "
Skinner, Clarence W.	III	Methuen, "
Smith, Arthur	III	" "
Smith, George A.	III	" "
Smith, Wm. E.	III	" "
Stopherd, Wm. H.	III	Lowell, "

## Third Year

Name	Course	Address
Abbott, Paul W.	I	Lowell, Mass.
Avery, Charles H.	III	" "
Bastow, Stephen W.	IV	Nashua, N. H.
Brouder, John J.	III	Lawrence, Mass.
Burnham, Joseph W.	III	" "
Duce, Benj.	III	No. Andover, "
Hanglin, Albert J.	IV	Lowell, "
Hebert, Charles L. J.	IV	" "
Hoessler, Carl, Jr.	III	Collinsville, "
Laffert, August W.	III	Lawrence, "
McCarthy, Joseph F.	III	" "
Michelmores, Harry	III	No. Andover, "
Nelson, Ernest H.	III	Lowell, "
Noble, John T.	IV	" "
Pedler, William A.	I	Methuen, "
Ring, Robert G.	IV	Lowell, "
Sargent, Herbert L.	III	Lawrence, "

## Second Year.

Name	Course	Address
Allen, Walter M. N.	VI	Lowell, Mass.
Armstrong, Elias B.	IIb	Waltham, "
Barker, John P.	III	Lowell, "
Barrington, James L.	IV	Methuen, "
Barry, S. Francis	V	Lawrence, "
Bennett, Coolidge J.	VI	Lowell, "
Bennett, Roy J.	VI	" "
Bishop, Warren A.	VI	" "
Bodwell, Henry A.	VI	Andover, "



Name	Course	Address
Bolles, Matthew	III	
Boutwell, Arthur T.	IV	Lawrence, Mass.
Bowie, Alexander O.	VI	Andover, "
Brookhouse, Albert L.	VI	Lawrence, "
Brown, William G.	IIB	Lowell, "
Brownell, Perry R.	IV	" "
Buckley, Harry	IV	" "
Campbell, Archibald	IV	Lawrence, "
Cheetham John J.	IV	Lowell, "
Cowdrey, Charles E.	III	" "
Davis, John P.	I	No. Billerica, "
Delano, James	IIB	Lowell, "
Delmage, Edward R.	V	" "
Dimlick, Wm. F.	IV	" "
Dodge, Frank	I	Lawrence, "
Dulligan, Charles E.	VI	Lowell, "
Edmond, Chester M.	VI	" "
Ehrenfried, Jacob B.	III	Lawrence, "
Eyers, Walter H.	III	Lowell, "
Fairbanks, Lester V.	VI	" "
Fairgrieve, John H.	III	" "
Flint, Leon G.	III	" "
Fulton, John M.	V	Lawrence, "
Gahm, George L.	VI	Lowell, "
Gibbons, John	V	" "
Hanlon, David A.	III	" "
Hardman, David B.	IV	Dracut, "
Hartwell, Henry E.	VI	Lawrence, "
Hedrick, Clifton F.	VI	" "
Higgins, James A.	V	Lowell, "
Hintze, Thomas F.	I	No. Billerica, "
Houle, Augustus E.	IV	Lowell, "
Houston, Wm. J.	IIB	" "
Howard, Ralph M.	VI	Lawrence, "
Hutton, Harold	V	" "
Inberg, Magnus	I	Lowell, "
Jasper, Joseph C.	VI	" "
Johnson, Ernest A.	V	" "
Johnson, Frank E.	IV	Lawrence, "
Kelly, Michael H.	III	" "
Kinne, Roy W.	IV	Lowell, "
Kirkland, Alexander S.	VI	" "
Lake, Wm. F.	III	" "
Lamont, Walter M.	V	" "
Lindsay, James B.	III	Lawrence, "
Livingston, Harris R.	IV	" "
Loiselle, Yvonne M.	III	Lowell, "
Maguire, James H.	I	" "
Marjerison, Thomas S.	III	" "
Martin, Willard E.	III	Lawrence, "
Mason, Lester O.	VI	Somerville, "
Mathueson, Stanley B.	VI	Lowell, "
McKercher, Frank J. F.	VI	" "
McLaughlin, Peter J.	I	" "
Morton, Albert N.	IIB	" "
Oliver, Walter	VI	" "
		Methuen, "

Name	Course	Address
Parkinson, Royal	VI	Lowell, Mass.
Perry, Arnold V.	VI	Methuen, "
Pihl, Christian E.	VI	Lowell, "
Pittendreigh, John M.	I	" "
Porter, Geo. K., Jr.,	III	Dorchester, "
Reardon, Timothy H.	VI	Lowell, "
Reynolds, Eugene A.	VI	" "
Royce, Fred	VI	Lawrence, "
Rushworth, Walter	VI	Lowell, "
Schubert, George J.	V	Lawrence, "
Shackleton, J. Henry	IV	" "
Sharpe, John R.	VI	Lowell, "
Sheppard, Byron H.	VI	Lawrence, "
Sill, Walter G.	III	" "
Souther, Channing W.	IIb	No. Chelmsford, "
Southgate, Herbert R.	IV	Lowell, "
Spurr, James H. Jr.	IV	Lawrence, "
Stearns, W. Arthur	VI	Lowell, "
Stewart, George	IV	Lawrence, "
Storer, Francis E.	IV	Lowell, "
Thomas, Roland V.	III	" "
Wadsworth, Alexander H.	IIb	Lawrence, "
Watson, Wm. A.	III	" "
Webb, Frank H.	III	Lowell, "
Webber, John F.	III	Roxbury, "
Whitcomb, Harry E.	I	Lowell, "
White, Royal P.	IV	" "
Wolf, Wm. C.	IV	Lawrence, "
Wolger, John J.	III	Methuen, "

#### First Year.

Name	Course	Address
Abell, Frederick T.	I	Lawrence, Mass.
Ackroyd, Theodore C.	IIb	Methuen, "
Adams, Alfred E., Jr.	IIb	Lowell, "
Ahearn, John T.	VI	" "
Alexander, Aaron O.	VI	Lawrence, "
Alexander, Wm. J.	V	Lowell, "
Allard, Damase	VI	" "
Ames, Harry	VI	" "
Amiot, Louis H.	V	" "
Anderson, Gustaf R.	III	" "
Andreski, Augustus F.	V	Lawrence, "
Andrews, James H.	VII	Lowell, "
Andrews, John Wm.	V	" "
Armstrong, Elias B.	IIb	Waltham, "
Arnold, Warren	III	Lowell, "
Arvidson, Carl A.	IV	" "
Ballantyne, Wm. J.	IV	" "
Ballinger, Frederick W.	IIb	No. Chelmsford, "
Balloch, John	IV	Lowell, "
Bannister, John T.	VI	Pelham, N. H.
Barber, Edward P.	III	Dracut, Mass.
Barber, James Ea.	IIb	No. Chelmsford, "
Barlow, Wilfred	IIb	Lawrence, "

Name	Course	Address
Barraclough, John E.	I	Lawrence, Mass.
Beal, Harold E.	III	Lowell, "
Begen, Thomas W.	IIb	Lawrence, "
Berry, Alfred H.	VI	Lowell, "
Blake, Francis R.	VI	" "
Blanchette, Tancrede L.	VI	" "
Boland, Thomas F.	III	Atherton Village, "
Bolland, Peter	I	Lowell, "
Bottomley, Jesse	IV	Methuen, "
Bowden, George E.	V	Lowell, "
Boyle, John J.	IIb	" "
Brien, George C.	VI	" "
Britton, Arthur D.	VI	" "
Brown, James T.	III	" "
Brown, Wm. A.	I	Lawrence, "
Buckley, Harold S.	VI	" "
Bucklitsch, Gus J.	IIb	" "
Bunker, Gordon	III	Lowell, "
Bunker, Horace M.	III	" "
Burgess, Joseph H.	V	Lawrence, "
Burnham, Wilmont V.	V	" "
Butterworth, John A.	IIb	" "
Buzzell, Prescott A.	IV	Lowell, "
Callahan, Daniel F.	VI	" "
Carden, Francis E.	IIb	" "
Carlson, Ernest B.	IIb	West Chelmsford, "
Carr, Andrew T.	VI	Lowell, "
Carter, Wm. A.	VI	" "
Caswell, Glen B.	VI	" "
Cayer, Albert J.	VI	" "
Cayer, Charles J.	VI	" "
Chadwick, Clifford	VI	Lawrence, "
Charleton, Peter	VI	Lowell, "
Christison, Hugh	IV	Lawrence, "
Cielak, John	V	Lowell, "
Cielak, Peter	V	" "
Clancy, Arthur	VI	" "
Clancy, John P.	III	" "
Clark, Adrian A.	V	" "
Clark, Thomas T.	III	Lawrence, "
Coates, Joseph	III	Lowell, "
Coburn, George E.	VI	" "
Collier, Wm. A.	III	Lowell, Mass.
Collins, Harold	VI	" "
Colwell, Henry L.	VI	" "
Coman, James G.	IV	" "
Comer, Ernest A.	III	" "
Cosgrove, James Wm.	VI	Lawrence, "
Coughlin, James J.	VI	" "
Crossley, Thomas	V	Lowell, "
Daly, Edward W.	III	" "
Davis, John P.	I	" "
Delaria, Alexander E.	VI	" "
Delmore, Martin F.	VI	" "
De Rainville, Arthur Z.	IV	" "
Desrosiers, Frank	V	" "

Name	Course	Address
Dickson, Andrew	IIa	Andover, Mass.
Dickson, Robert Wm.	III	" "
Dixon, Arthur	III	Methuen, "
Dobbs, William	IIb	Lowell, "
Donnellan, Robert E.	IV	" "
Dougherty, James	V	" "
Duckworth, Jonathan, Jr.	VI	" "
Dudley, Frank L.	IV	" "
Dunfey, Matthew J.	VI	" "
Dunn, George C.	III	" "
Dwyer, George W.	VI	" "
Dwyer, Louis H.	III	" "
Eadie, George W.	III	" "
Eichorn, Frank	VI	Lawrence, "
Ekengren, Johan A.	VI	Lowell, "
Eldred, Calvin P.	VI	" "
Eldridge, Everett M.	III	Lawrence, "
Ellis, George Wm.	VII	Lowell, "
Elston, Frank	IIb	Methuen, "
Farrell, John H.	V	Lowell, "
Ferguson, Thomas	III	" "
Fernans, Anthony Wm.	III	Lawrence, "
Field, Osmond F.	IV	Lowell, "
Fielding, Benj.	VI	" "
Florence, Joseph B.	IV	" "
Franz, Albert H.	VI	Lawrence, "
Frechette, Alphonse	IIb	" "
Gale, Chester F.	VI	Lowell, "
Gibbons, John	V	" "
Gill, Joseph	IV	Lawrence, "
Gill, Walter	VII	" "
Girard, Harry N.	III	Lowell, "
Glispin, Charles F.	V	" "
Golden, Thomas L.	III	" "
Goldthwaite, Ira Wm.	III	" "
Goodchild, George	IIb	" "
Gore, Lyman W.	IIb	" "
Graney, James E.	III	Dracut, "
Gregson, Robert B.	I-V	Lowell, Mass.
Grogan, Michael	IIb	" "
Gunston, Walter J.	III	" "
Gustafson, Anders S.	VI	" "
Hagan, Joseph F.	V	" "
Haigh, Wm.	V	" "
Hale, Wesley I.	III-VI	Lawrence, "
Hamblett, Harry A.	I	Dracut, "
Hammersley, John R. B.	V	Lowell, "
Hanley, John E., Jr.	V	Collinsville, "
Hanscom, Maebelle	III	Lawrence, "
Hanson, Edward	I-III	Lowell, "
Hanson, Fred	III	Dracut, "
Harrington, Michael E.	V	Lowell, "
Harrington, Patrick H.	VI	" "
Hart, Carlos A.	I	" "
Hart, Dana B.	I	" "
Hart, Eli B.	III	" "

Name	Course	Address
Hatch, Henry A.	VI	Lowell, Mass.
Hausler, Fred	VI	Lawrence, "
Heap, James E.	VI	Lowell, "
Heap, John R.	VI	" "
Hennessy, Charles	VI	" "
Herdegen, Charles	V	Lawrence, "
Hickson, Frank A.	VI	Lowell, "
Higgins, John J.	VI	" "
Higgins, Michael H.	V	Lowell, Mass.
Hills, James L.	VI	Pelham, N. H.
Hobbs, Atwood B.	VI	Lowell, Mass.
Hopper, Wm.	III	Lawrence, "
Howard, John	IIa	Lowell, "
Hoyle, Edward	IV	No. Chelmsford, "
Hunter, John	III	Lawrence, "
Huson, Frank H.	V	Methuen, "
Hutton, John M.	V	Lowell, "
Hyde, Frederick	III	" "
Inberg, Magnus	I	" "
Ingraham, Wm. M.	III	" "
Jackson, Wm. Clark	IIb	" "
Johnson, H. Craig	V	" "
Johnston, Edward J.	V	" "
Jones, John L.	VI	" "
Jordan, Seth N.	VI	" "
Keeler, Robert J.	VI	" "
Kelleher, Francis Wm.	VI	" "
Kent, Arthur	III	" "
Keyes, Joseph P.	IV	" "
Knox, Wm. J.	VI	" "
LaDuke, Charles A.	VI	" "
Lapan, Felos F.	VI	" "
Leach, Ernest	III	" "
Lehmann, Wm.	VI	Lawrence, "
Lewis, Charles	I	Lowell, Mass.
Lindsay, Clarence D.	III-V	Andover, "
Linehan, Thomas W.	IIb	Lawrence, "
Lister, James R.	IV	" "
Lorenz, Albert	IV	" "
MacCormick, James H.	V	Lowell, "
Madden, Francis J.	VI	" "
Maguire, James H.	I	" "
Manchester, George W.	III	Lawrence, "
Mangan, John T.	III	Lowell, "
Marsden, William	III	No. Andover, "
Marshall, James A.	III	Lawrence, "
Marshall, Fred K. R.	VI	Methuen, "
Martin, James F.	III	Lowell, "
Martin, John C., Jr.	V	" "
Maynard, George A.	VI	" "
Maynard, Guy A.	VI	" "
McAleer, John J.	I	" "
McCann, Mark J.	VI	" "
McCort, Walter J.	VI	" "
McDonald, Thomas J.	VI	Dracut, "
McDonough, John L.	III	Lowell, "

Name	Course	Address
McFarland, La Parris	V	Lowell, Mass.
McKeown, Austin	IV	" "
McKinnon, Duncan	III	Lawrence, "
McLay, John	V	So. Lawrence, "
McNiff, Michael H.	VI	Lowell, "
McQuaide, James J.	VI	Lowell, Mass.
Meer, Francis J.	VI	" "
Meinelt, Wm. E.	V	Lawrence, "
Meister, Henry	IV	Boston, "
Meister, Peter	VI	Lawrence, "
Miller, Wilfred M.	VI	" "
Miller, William	IV	" "
Mitchell, John W.	VI	Lowell, "
Molony, Frank L.	VI	" "
Montgomery, J. Roy	III	" "
Morgan, Guy E.	VI	" "
Morris, Grover C.	IIb	" "
Morton, Albert N.	IIb	" "
Muldoon, Edward A.	V	" "
Mullaney, James H.	III	" "
Murphy, Cornelius D.	IIa	" "
Murphy, Edward A.	VI	" "
Murray, George A.	VI	" "
Murray, James J.	IIb	" "
Nelson, Charles	IIb	West Chelmsford, "
Nelson, Warren B.	IV	Nashua, N. H.
Neubert, Oscar	IIb	Lawrence, Mass.
Noonan, Mark	VI	Lowell, "
Norton, Gorham N.	III	Lawrence, "
Nutter, James R.	VI	Lowell, "
O'Brien, John J.	VI	Lowell, Mass.
O'Brien, Michael F.	IIb	" "
O'Brien, Wm. P.	III	Roxbury, "
O'Dea, James L.	IV	Lowell, "
O'Hlson, Harry E.	VI	" "
O'Leary, James J.	VI	" "
O'Loughlin, Thomas J.	V	" "
O'Neill, Charles F.	IV	" "
Osbeck, Wm. J.	III	Lawrence, "
Overend, John	III	Lowell, "
Palm, James B.	VI	" "
Paquette, Donat N.	VI	" "
Pasho, Harry J.	VI	Billerica, "
Patterson, Alfred H.	III	Lawrence, "
Pearson, August L.	VI	Lowell, "
Peck, Wm. E.	III	" "
Perreault, Joseph E.	VI	" "
Perron, Frank L.	V	" "
Perry, Richard F.	VI	Lawrence, "
Peterson, Albert E.	VI	Lowell, "
Pickin, Wm.	III	No. Chelmsford, "
Pilkington, Charles	V	Lowell, "
Pollard, George E.	V	Methuen, "
Potter, Richard W.	III	Lowell, "
Preble, George A.	III	" "
Prescott, Glenn C.	VI	" "



Name	Course	Address
Prue, John W.	I	Lowell, Mass.
Pushee, Jesse M.	I	Nashua, N. H.
Rachette, Ubald	V	Lowell, Mass.
Reardon, John S.	VI	" "
Redman, Henry	I	" "
Richards, Francis G.	IIa	No. Andover, "
Riddick, Herbert C.	V	Lowell, "
Ritter, Alfred E.	IIb	Lawrence, "
Robbins, John	IIb	No. Chelmsford, "
Robinson, Chester B.	IV	Lowell, "
Rooney, Hugh	VI	" "
Roux, Arthur J.	VI	" "
Rudolph, Fred P.	VI	Lawrence, "
Rutyna, Barney	IV	Lowell, "
Russell, Edwin F.	VI	Methuen, "
Russell, Frederick N.	IIb-VI	Lowell, "
Ryan, Parker F.	IIb	Lawrence, "
Saxon, Harry	VI	" "
Scally, Edward	VI	Lowell, "
Schaufus, Emil	VI	" "
Seddon, Noah G.	III	Lawrence, "
Semple, Alexander	III	Lowell, "
Senior, George	I-V	" "
Shackleton, Albert	VI	Lawrence, "
Sheehan, Wm. F.	IV	Lowell, Mass.
Shelley, John P.	IIa	" "
Shyne, John J.	V	" "
Sidebottom, John W.	VI	" "
Silcox, Samuel H.	II	" "
Silk, Patrick E.	VII	Methuen, "
Simonean, Verner W.	VI	Lowell, "
Smith, Arthur	V	Methuen, "
Smith, George A.	I	Lowell, "
Son, Henry	VII	" "
Stephens, Paul S.	VI	" "
Stoehrer, Robert F.	VI	Andover, "
St. Hilaire, Arthur	VI	Lowell, "
St. Pierre, Dieudonne	VI	Lawrence, "
Stursberg, Paul W.	VI	Lowell, "
Sullivan, Wm. H.	III	" "
Sweeney, Charles A., Jr.	IV	" "
Sweeney, Charles F.	I	" "
Sykes, Alvin E.	VI	" "
Taff, William F.	V	" "
Tarney, Thomas	I	" "
Teschner, Eric P.	VI	Lawrence, "
Trimble, Warren W.	IV	Lowell, "
Vaillancourt, Irenece	V	" "
Vaillancourt, Joseph A.	V	" "
Vogt, Harry A.	V	Lawrence, "
Waddell, Robert	III	Lowell, "
Wade, Albert E.	III	Lowell, Mass.
Walker, James P.	IIb	No. Chelmsford, "
Walker, Wm.	VII	Lowell, "
Walsh, Wm. P.	IV	" "
Ward, James J.	VII	" "

Name	Course	Address
Waugh, William	IV	Lowell, Mass.
Webster, Ray	IV	" "
Weisner, Alfred H.	III	Lawrence, "
Welton, Alton R.	VI	" "
Whatmough, James H.	V	Lowell, "
Whitcomb, Harry E.	V	" "
Whittaker, Thomas	I Ib	Lawrence, "
Willgeroth, Henry J.	III	" "
Wilson, Lawrence J.	VI	" "
Wilson, Samuel	VI	" "
Wiswall, Frank T.	III	" "
Woodman, Harry L.	VI	" "

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#### SUMMARY

Day Students . . . . .	151
Evening Students . . . . .	441
Total . . . . .	592
Names counted twice . . . . .	25
	<hr/> 567

## CLASS OF 1906.

### Graduates with Titles of Thesis

#### DAY CLASS.

Diplomas were awarded as follows:

- Herbert Augustus Currier, Cotton Manufacturing, Somerville, Mass.  
"Notes on the Production of a Cotton Suiting."
- Frank Mitchell Curtis, Cotton Manufacturing, Roxbury, Mass.  
"A Comparison of Strength between Combed and Carded Yarns."
- Herbert Charles Wood, Cotton Manufacturing, Lowell, Mass.  
"Notes and Plans of an Economic Layout for a Print Cloth Mill."
- Charles Henry Avery, Wool Manufacturing, Newtonville, Mass.  
Thesis with R. H. Bradford.  
"The Functions of the Various Parts of a Double  
Cylinder 4 Lickerin Worsted Card."
- Roy Hosmer Bradford, Wool Manufacturing, Lowell, Mass.  
Thesis with C. H. Avery.
- Arthur Joseph Hennigan, Wool Manufacturing, Dorchester, Mass.  
Thesis with G. C. Swan.  
"Actual versus Theoretical Draft in Gilling and Drawing."
- Guy Carleton Swan, Wool Manufacturing, Lawrence, Mass.  
Thesis with A. J. Hennigan.
- Arthur Clayton Varnum, Wool Manufacturing, Lowell, Mass.  
Thesis with C. R. Church.  
"A Comparison of Cap, Flyer and Ring Spun Yarns."
- Charles Whittier Churchill, Designing, Lowell, Mass.  
"Reversible and Multiple Weaves as Applied to Dress Fabrics."
- Edward Earle Cole, Chemistry and Dyeing, Haverhill, Mass.  
"The Effect of Potassium Bichromate on Mordant  
Acid Colors as Regards their Fastness to Light."
- Frank Everett Fleming, Chemistry and Dyeing, Lowell, Mass.  
"Tendering of Cotton Fibers Dyed with Sulphur Blacks,  
its Cause and Prevention."
- William Henry Wightman, Chemistry and Dyeing, Lawrence, Mass.  
"The effects of the Permanent Hardness of Water upon  
the Application of the Artificial Dyestuffs."

Certificates for Partial Courses were awarded as follows:

Charles Royal Church,	Woolen and Worsted Spinning, and Weaving, Thesis with A. C. Varnum.	Lowell, Mass.
George Leonhard Gahm,	Woolen and Worsted Spinning, and Weaving. Thesis with H. W. Hildreth. "Experiment on a Woolen Card using Strippers as Workers."	Jamaica Plain, Mass.
Sadie Agnes Gillon,	Decorative Art, "A Corner of a Lace Curtain."	Lowell, Mass.
Harold William Hildreth,	Woolen and Worsted Spinning, and Weaving. Thesis with G. L. Gahm.	Westford, Mass.
Thomas Forsyth Hintze,	Cotton Spinning, "A Comparison of Strength between Yarns made with a Short and a Long Card Draft."	Syracuse, N. Y.
Clarence LeBaron Kent,	Designing and Weaving, "The Design and Construction of Worsted and Union Overcoatings."	Lawrence, Mass.
John William Lane,	Cotton Spinning and Weaving, "A Comparison of Strength between Single and Ply Yarns."	Wakefield, Mass.
William Henry McDonnell,	Cotton Spinning and Weaving, "Notes on the Production of Waste Yarns."	South Boston, Mass.
Guy Houghton Newcomb,	Chemistry, "A Study of Wool with the Ultimate Object of Determining its Comparative Action toward Sodium and Potassium Compounds."	Fitchburg, Mass.
Isabel Halliday Reynolds,	Post Graduate Designing, and Weaving, "The Advantages of the Metric System for Textile Calculations."	No. Andover, Mass.
Alexander Charles Stohn,	Designing and Weaving, "The Use and Abuse of the Double Plain Weave in Textile Design"	Roslindale, Mass.
Charles Beauregard Woodruff,	Weaving,	Boston, Mass.

## Evening Class of 1906

Certificates were awarded as follows, May 9, 1906:

### Course I—3 years.

(Cotton Spinning)

Paul W. Abbott  
William Arthur Pedler

Lowell, Mass.  
Methuen, "

### Course I—2 years.

(Cotton Spinning)

Frank Dodge  
Magnus Inberg  
James Henry Maguire  
Peter Joseph McLaughlin  
John Malcolm Pittendreich  
Harry Earl Whitcomb

Lowell, Mass.  
" "  
" "  
" "  
" "

### Course IIa—1 year.

(Woolen Spinning)

Andrew Dickson  
John Howard  
Cornelius Dominic Murphy  
Francis Gordon Richards

Andover, Mass.  
Lowell, "  
" "  
No. Andover, "

### Course IIb—2 years.

(Worsted Spinning)

Elias Benjamin Armstrong  
William Gilchrest Brown  
Albert Nowell Morton

Waltham, Mass.  
Lowell, "  
" "

### Course III—Post Graduate

(Designing)

Herbert Bake  
James Plunkett Brown  
Hugo Paul Dick  
Benjamin Charles Dimlick  
Emil M. Frank  
Andrew Molloy  
Clarence W. Skinner  
Arthur Smith  
George Arnold Smith  
William Edward Smith  
William Herbert Stopherd

Lawrence, Mass.  
Lowell, "  
Lawrence, "  
" "  
" "  
Lowell, "  
Methuen, "  
" "  
" "  
" "  
Lowell, "

### Course III—3 years.

(Designing)

John J. Brouder  
Joseph Willis Burnham  
Benjamin Duce  
Carl Hoessler, Jr.

Lawrence, "  
" "  
No. Andover, "  
Collinsville, "

August Wilhelm Laffert  
Joseph Francis McCarthy  
Harry Michelmores  
Ernest H. Nelson

Lawrence, "  
" "  
No. Andover, "  
Lowell, "

#### Course IV—4 years.

(Chemistry and Dyeing)

John Thomas Evers  
Thomas Edward Kidd  
David Augustine O'Brien

Lowell, Mass.  
" "  
" "

#### Course V—2 years.

(Weaving)

John McCord Fulton  
Harold Hutton  
Ernest A. Johnson  
George J. Schubert

Lowell, Mass.  
" "  
Lawrence, "  
" "

#### Course V—I year.

(Cotton Weaving)

Louis Henry Amiot  
Joseph H. Burgess  
Robert Burton Gregson  
George Senior  
Arthur Smith

Lowell, Mass.  
Lawrence, "  
Lowell, "  
" "  
Methuen, "

#### Course V—I year.

(Woolen and Worsted Weaving)

Wilmont Varney Burnham  
William Haigh  
John Morley Hutton  
John McLay  
Harry Adolph Vogt

Lawrence, Mass.  
Lowell, "  
" "  
South Lawrence, "  
Lawrence, "

#### Course VI—2 years.

(Mechanics and Electricity)

Henry Edward Hartwell  
Christian Edward Pihl  
Timothy Henry Reardon  
Eugene Alvin Reynolds  
Walter Rushworth  
John Rollins Sharpe  
Byron Houston Sheppard

Lawrence, Mass.  
Lowell, "  
" "  
" "  
" "  
" "  
Lawrence, "

#### Course VII—1 year.

(Finishing)

George William Ellis  
Patrick Edward Silk  
James Joseph Ward  
William Walker, Jr.

Lowell, Mass.  
Methuen, "  
Lowell, "  
" "



## Alphabetical List of Graduates

Name	Course	Class	Day or Evening
Abbott, Edward M.	II	1904	D
Adams, Henry S.	IIa	1903	E
“ “	I	1905	D
Adams, Michael E.	VI	1904	E
Adams, Wm. R.	IIa	1902	E
Arundale, Henry B.	II-III-V	1905	D
Aspinwall, Wm.	IIb	1901	E
Bailey, Joseph W.	I	1899	D
Bake, Herbert	III	1905	E
Baldwin, Arthur L.	IV	1900	D
Baldwin, Frederick A.	II	1904	D
Balmforth, James H.	IIa	1903	E
“ “	IIb	1904	E
Balmforth, Wm. F.	VI	1904	E
Balmforth, Martha B.	III	1903	E
Barker, John P.	V	1904	E
Barlow, Robert	V	1902	E
Barr, I. Walwin	I	1900	D
Barrington, John A.	IV	1904	E
Barry, Edward J.	III	1903	E
Bastow, Henry	III	1903	E
“ “	V	1905	E
Baxter, Alvah J.	IIa	1903	E
Bell, Frederick W.	IIa	1905	E
Bennett, Edward H.	V	1903	D
*Berry, Frank M.	III	1899	E
“ “	V	1901	E
Binns, Heaton	II-V	1899	E
“ “	VI	1902	E
Bloom, Wilfred N.	IV	1903	D
Bodwell, Henry A.	II	1900	D
Boucher, John L.	VI	1904	E
Bowie, Samuel A.	VI	1905	E
Bowring, George P. B.	VI	1902	E
Boyd, George A.	I	1905	D
Bradley, Richard H.	V	1901	D
Brainerd, Irving L.	I	1902	E
Brickett, Chauncey J.	II	1900	D
Broadbent, James T.	I	1899	E
Brooks, Noah	III-V	1901	E
Brown James P.	III	1905	E
Bryant, Ernest L.	VI	1905	E
Buchan, Donald C.	II	1901	D
Burghardt, Edward S.	IIa	1901	E
Burghardt, Paul C.	IIa	1902	E
Burke, Thomas F.	I	1905	E
Burnham, Frank E.	IV	1902	D
Burns, Edward J.	IV	1905	E
Burns, James E.	IV	1905	E
Burrage, Katherine C.	IIIb	1899	D
Burrage, Katherine C.,	P. G. IIIb	1900	D
Butler, Benj. O.	VI	1904	E
Buzzell, Wm. O.	III	1901	E

\*Deceased

Name	Course	Class	Day or Evening
Buzzell, Wm. O.	P. G. III	1902	E
Byam, Walter S.	VI	1903	E
Cady, Dennis J.	V	1903	E
Callahan, Patrick A.	VI	1904	E
Campbell, Albert D.	IIb	1900	E
Campbell, Laura E.	IIIb	1900	D
Campbell, Louise P.	IIIb	1903	D
Campbell, Orison S.	II	1903	D
Caron, Cleophas	I	1905	E
Carr, George E.	I	1905	D
Carter, Robert A.	IV	1902	D
Cawthra, Albert B.	IIb	1900	E
Chamberlin, Frederick E.	I	1903	D
Cheetham, John James	III	1901	E
“ “ “	P. G. III	1902	E
Cheetham, John Joseph	I	1904	E
Chippindale, Ernest W.	IIb	1901	E
Clapp, F. Austin	II	1904	D
Clogston, Raymond B.	IV	1904	D
Colby, Arthur D.	I	1900	E
Cole, James T.	II	1905	D
Collier, John	III	1899	E
“ “	P. G. III	1902	E
Collins, John A.	IIa-b	1905	E
Conklin, Jennie G.	IIIb	1905	D
Conley, Frederick A.	VI	1904	E
Connors, Edward F.	VI	1904	E
Cook, Cheney E.	III	1905	E
Cowdell, Herbert	V	1901	E
Cowdrey, Charles E.	V	1902	E
Craig, Clarence E.	III	1902	D
Cremmin, Daniel J.	I	1902	E
Crompton, Henry H.	II	1899	E
Culver, Ralph E.	IV	1904	D
Curran, Charles E.	III	1902	D
Currier, John A.	II	1901	D
Curtis, William L.	II	1905	D
Custer, James J. E.	V	1905	E
Cutler, Benjamin W., Jr.	III	1904	D
Cuttle, James H.	II	1899	D
Dana, Clarence A.	VI	1905	E
Davis, Henry	IIb	1901	E
Davis, Prentice T.	I	1904	E
Delmage, Edward R.	III	1904	E
Dempsey, John W.	IIa	1904	E
Dewey, James F.	II	1904	D
Dick, Hugo P.	III	1905	E
Dillon, James H.	III	1905	D
Dimlick, Benjamin C.	III	1905	E
Donahue, Michael F.	VI	1904	E
Donald, Albert E.	II	1904	D
Donovan, Daniel F.	II	1901	E
Donnellan, Frank T.	IIa	1902	E
“ “	V	1903	E
Donnelly, James	I	1900	E
Doole, George L.	VI	1904	E

Name	Course	Class	Day or Evening
Dooley, Edward Wm.	VI	1904	E
Dudley, George E.	I	1902	E
Duggan, Francis P.	VI	1904	E
Elston, Fred R.	III	1900	E
Emerson, Frank W.	II	1903	D
Erbe, Gustave	VI	1905	E
Evans, Alfred W.	III	1903	D
Evans, William R.	III	1903	D
Evison, William A.	V	1901	E
Ewer, Nathaniel T.	IV	1901	D
Farrell, Thomas	IIa	1901	E
Fels, August B.	II	1899	D
Ferguson, Arthur F.	I	1902	D
“ “	I	1903	D
Ferguson, Thomas	V	1902	E
Field, Charles W.	VI	1902	E
Flynn, John J.	VI	1903	E
Forrest, Fred G.	IIa	1902	E
Fortune, David A.	IIb	1902	E
Foster, Clifford E.	II	1901	D
Foster, Sherwood L.	I	1905	E
Frame, William	V	1901	E
Frank, Emil M.	III	1904	E
French, Ernest J.	I	1905	E
Fuller, George	I	1903	D
Gagan, John H.	V	1901	E
Garner, William	III	1903	E
Gaunt, Alfred C.	III	1899	E
“ “	P. G. III	1902	E
“ “	IIa	1903	E
“ “	IIb	1904	E
Gay, Earle Byron	I	1905	E
Gerrish, Walter	III	1903	D
Good, Henry	I	1902	E
Goodchild, George	I	1903	E
“ “	VI	1905	E
Goodhue, Amy H.	IIIb	1900	D
(See Harrison)	P. G. IIIb	1901	D
Grant, Archibald	IIb	1901	E
Gray, Finley M.	VI	1903	E
Grouke, Michael	IIb	1901	E
Haigh, Walter	III	1902	E
Halsell, Elam R.	I	1904	D
Harder, Elmer E.	VI	1905	E
Harmon, Charles F.	I	1899	D
Harriman, Henry I.	V	1899	D
Harris, Charles E.	I	1905	D
Harris, George S.	I	1902	D
Haskell, Walter F.	IV	1902	D
Hastings, Walter M.	I	1899	D
Haven, George W.	III	1905	E
Haworth, Joseph	VI	1902	E
Hempel, Frank	V	1904	E
Higgins, James A.	IIa	1903	E
“ “	IIb	1904	E
Hill, Daniel	IIb	1901	E

Name	Course	Class	Day or Evening
Hitchcock, Thomas B.	I-II-III	1901	E
Hogan, James A.	V	1902	E
Holgate, Charles H.	IIa	1901	E
Holgate, Benjamin	III	1902	D
" "	V	1903	D
Hollings, James L.	I	1905	D
Hook, Russell W.	IV	1905	D
Horsfall, George G.	II	1904	D
Howard, John	V	1900	E
" "	III	1903	E
Howard, Thomas	V	1905	E
Hoyle, Joseph	IIb	1904	E
Hoyle, Edward	IIb	1902	E
Hunt, Chester L.	III	1905	D
Hunt, Herbert R.	VI	1905	E
Hunter, Ralph	III	1901	E
" "	V	1903	E
Hunton, Lewis G.	IV	1905	E
Hutton, Clarence	V	1900	E
" "	III	1903	D
Jeannotte, Arthur	VI	1904	E
Jennings, James J.	III	1903	E
Johnson, Ernest A.	IIa-b	1902	E
Johnson, Samuel L.	V	1903	E
Jones, Everett A.	II	1904	D
" "	III	1905	D
Jones, William J.	IIb	1900	E
" "	IIa	1901	E
Jury, Alfred E.	IV	1904	D
Keleher, John J.	IIb	1903	E
Kellett, Irvine	II	1899	E
Kelley, Michael H.	I	1902	E
Kent, Ernest J.	IIb	1902	E
Kenworthy, Joseph	I	1905	E
Kershaw, William E.	V	1904	E
Killerby, Walter	IIb	1901	E
Kimball, Irving D.	VI	1905	E
Kingsbury, Percy F.	IV	1901	D
Knowles, Frank E.	I	1903	E
Lakeman, Fannie S.	IIIb	1900	D
Lamont, Walter M.	IIb	1902	E
Lamson, George F.	I	1900	D
" "	VI	1905	E
Langevin, Felix D.	VI	1904	E
Law, Alfred	IIb	1901	E
Lawliss, Augustine J.	V	1902	E
Lawrence, Charles	I	1903	E
Leach, John P.	I-V	1900	D
Leach, Joseph W.	V	1903	E
Lee, Charles	I	1902	E
Lee, William H.	V	1905	D
Leith, Edwin E.	III	1902	E
Lewis, Walter S.	IV	1905	D
Libby, C. Robert	VI	1902	E
Lincourt, Hector L.	VI	1903	E
Linkletter, Alfred C.	VI	1905	E
Lord, Harry D.	III	1904	E

Name	Course	Class	Day or Evening
Lord, Wilfred	III	1901	E
" "	IIb	1903	E
" "	IIa	1904	E
Lovell, Charles E.	VI	1905	E
Lucey, Edmund A.	II	1904	D
Mackay, Rowland N.	I	1899	D
MacPherson, Wallace A.	III	1904	D
Maden, Harry	IIb	1900	E
Maguire, James H.	VI	1905	E
Marjerison, Isaiah D.	II	1899	E
Marinel, Walter N.	I	1901	D
Martin, John C., Jr.	IIa-b	1905	E
Mason, Frederick A.	I	1903	E
McAllister, John W.	V	1899	E
McBride, Robert G.	IIa	1904	E
McKenna, Hugh F.	IV	1905	D
McManus, Hugh	V	1905	E
McQuade, Hugh B.	V	1901	E
Meadows, William R.	I	1904	D
Merchant, Edith C.	IIIb	1900	D
Merrill, Edwin C.	VI	1904	E
Midwood, Arnold J.	IV	1905	D
Miller, Emil H.	V	1904	E
Minge, Jackson C.	I-V	1901	D
" "	III	1901	E
Moir, Alexander L.	III	1899	E
" "	P. G. III	1903	E
Molloy, Andrew	V	1902	E
" "	III	1905	E
Moore, Everett B.	I	1905	D
Moorhouse, William R.	IV	1901	D
Moorehouse, Thomas	VI	1904	E
Morris, Frank A.	V	1901	E
Morrison, Fred C.	I	1903	D
Mortenson, Carl W.	III	1903	E
Mozley, Arthur	VI	1903	E
Murphy, John H.	VI	1904	E
Myers, James W.	III-IV	1903	E
Najarian, Garabed	IV	1903	D
Nelson, Ernest H.	IIb	1900	E
" "	IIa	1901	E
Nicholson, Richard	IIb	1903	E
Noble, John T.	V	1899	E
" "	III	1901	E
Noonan, Denis T.	III	1903	E
Notman, Frederick W.	I	1904	E
Nugent, Thomas A.	II-V	1899	E
" "	VI	1902	E
O'Donnell, John D.	I	1904	D
Ogley, Samuel A.	IIb	1900	E
O'Hara, William F.	IV	1904	D
O'Neill, Peter F.	IV	1905	E
Osgood, Charles F.	I	1900	E
" "	VI	1902	E
Overend, John	V	1905	E
Palmer, G. Buel	III	1903	E
Parker, B. Moore	I	1901	D

Name	Course	Class	Day or Evening
Parker, Everett N.	I	1904	D
" "	I	1905	D
Parker, Harry C.	V	1900	D
Patrick, Alexander	III	1904	E
Peel, Hudson	IIb	1901	E
Perkins, Jonh N.	III	1900	D
Petty, George E.	I-V	1903	D
Potter, Richard W.	V	1902	E
Pradel, Alois J.	III	1900	D
Pratt, Albert S.	I	1901	D
Ramsdell, Theodore E.	I	1902	D
*Rasche, William A.	III	1903	D
Redman, Henry S.	III	1904	E
" "	V	1905	E
Reed, Foster C. K.	VI	1904	E
Reynolds, Hiram L.	III	1901	E
Reynolds, Isabel H.	III-V	1903	D
Rhodes, Joseph E.	V	1904	E
Roberson, Pat H.	I	1905	D
Roberts, Carrie I.	IIIb	1905	D
Robinson, William C.	III-V	1903	D
Rockwell, Henry D.	IIa	1903	E
Rockwell, Samuel F.	IIa	1902	E
Rooney, George W.	I	1904	E
*Rowell, Herman C.	I-IIb	1900	E
Saunders, Edward B.	III	1901	E
Scanlon, Edward J.	IIb	1901	E
Schermerhorn, George E.	I	1902	E
Schofield, John S.	III	1903	E
Schoon, Fenton	IIb	1903	E
Shannon, Philip J.	V	1901	E
Shaw, James	V	1904	E
Silcox, Arthur E.	I	1900	E
Silk, Frederick C. M.	IV	1905	E
Simola, Emil J.	IIa-b	1905	E
Skinner, Clarence W.	III	1905	E
Sleeper, Robert R.	IV	1900	D
Smith, Arthur	III	1905	E
*Smith, Albert A.	I	1899	D
Smith, Edward	I	1904	E
Smith, Fred	IIb	1901	E
Smith, George A.	III	1905	E
Smith, John W.	IIb	1904	E
Smith, Ralston F.	I	1904	D
Smith, Stephen E.	I	1900	D
Smith, William E.	III	1905	E
Smith, William H.	IIb	1902	E
Snelling, Fred N.	II	1903	D
Snow, Fred L.	IV	1900	E
Spedding, Ephriam H.	III	1899	E
Spiegel, Edward	V	1903	D
Sterling, Walter	III	1904	E
Stevens, Dexter	I	1904	D
Stevens, Frank W.	VI	1905	E
Stevenson, Murray R.	III-V	1903	D
Stevenson, William	II	1899	E
" "	III	1902	E

\*Deceased



Name	Course	Class	Day or Evening
Stewart, Arthur A.	II	1900	D
Stewart, Walter L.	III	1903	D
Stockham, Burton I.	IV	1903	E
" "	P. G. IV	1904	E
Stopherd, William H.	II-V	1899	E
" "	VI	1902	E
" "	III	1905	E
Swift, Edward S.	V	1899	E
" "	I	1901	E
" "	III	1902	D
Syme, James F.	II	1900	D
Tarpey, John F.	IIa	1904	E
Thomas, Roland V.	I	1905	D
Thompson, Everett L.	I	1905	D
Thompson, Henry J.	IV	1900	D
Thompson, Charles B.	VI	1904	E
Tilton, Elliott T.	II	1899	D
Tonge, John	IV	1905	E
Tonge, Matthew	III	1903	E
Toovey, Sidney E.	II	1904	D
Umpleby, Thomas B.	V	1902	E
Upton, Frank A.	I	1903	E
Varney, Manley H.	III	1902	E
" "	I	1903	E
Vogt, Alfred H.	III	1902	E
Walker, Anna G.	IIIb	1903	D
Walker, David	III	1902	E
" "	P. G. III	1903	E
Wardrobe, Wm. L.	I	1900	E
Warren, Philip H.	II	1905	D
Waterhouse, Joseph	IV	1900	E
Webb, Francis H.	V	1904	E
Webb, Frank H.	IV	1904	D
Webber, Arthur H.	IV	1901	D
Wesson, Paul B.	I	1901	E
Wheelock, Stanley H.	II	1905	D
White, Royal P.	II	1904	D
Whitehead, Bennett	IIb	1901	E
Wilde, Thomas E.	IIa	1905	E
Willey, Frank S.	I	1901	E
Williamson, Isaac F.	IV	1901	E
Wilmot, William	III	1899	E
Wilson, Calvin E.	IIb	1902	E
Wilson, George H.	IIb	1902	E
Wilson, John S.	II	1903	D
Wilson, Walter E. H.	I	1904	D
Wilton, George H.	III	1899	E
Wing, Charles T.	III	1900	E
" "	III	1902	D
Wise, Paul T.	II	1901	D
Wiswall, Frank T.	V	1905	E
Wood, Jonathan	I	1902	E
Woodbury, W. Sanford	I	1900	E
Woodies, Ida A.	IIIb	1900	D
" "	P. G. IIIb	1901	D
Woodman, Harry L.	I	1902	D
Wright, Edward, Jr.	II	1905	D

## List of Past Students

- (C) Indicates Certificate, Partial Course.  
 (D) Indicates Diploma, Complete Course.  
 (P.G.) Indicates Post Graduate Course.  
 (x) Indicates Last Known Address.  
 (\*) Deceased.

### Day Course, 1899.

Name	Course	Occupation
Bailey, Joseph W.	I D	Principal, Bradford-Durfee Textile School, Fall River, Mass.
Burrage, Katherine (.	IIIb C	Teacher, Evening Drawing School, Lowell, Mass.
Cuttle, James H.	II D	Designer, Harding, Whitman and Co., New York City.
Fels, August B.	II D	Sec. to Gen. Mgr., Mass. Electric Co., Boston, Mass.
Harriman, Henry I.	V	With Geo. W. Stafford Co., Readville, Mass.
Hastings, Walter M.	I	Asst. to Agent, Arlington Mills, Lawrence, Mass.
Harmon, Charles F.	I D	In business, Lowell, Mass.
Mackay, Rowland N.	I	Selling Agent, American Loom Co., Readville, Mass.
*Smith, Albert A.	I D	
Tilton, Elliott T.	II D	Electrician, General Electric Co., Boston, Mass.

### Evening Course, 1899.

*Berry, Frank M.	III C	
Binns, Heaton	II-V C	Overseer, Bigelow Carpet Co., Lowell, Mass.
Broadbent, James T.	I C	Instructor Carding and Spinning, Bradford-Durfee Textile School, Fall River, Mass.
Collier, John	III C	Superintendent, Knoxville Woolen Mills, Knoxville, Tenn.
xCrompton, Henry H.	II C	Second Hand, French Drawing, Arlington Mills, Lawrence, Mass.
Gaunt, Alfred C.	III C	Supt. and Designer, Tremont Worsted Co., Methuen, Mass.
Kellett, Irvine	II C	Second Hand Worsted Spinning, Lower Pacific Mills, Lawrence, Mass.
xMarjerison, Isaiah D.	II C	Second Hand, Arlington Mills, Lawrence, Mass.
xMcAllister, John W.	V C	Salesman, H. A. Metz and Co., New York City.
Moir, Alexander L.	III C	Letter Carrier, Lowell, Mass.
Noble, John T.	V C	Bookkeeper, Walsh Mills, Lowell, Mass.
Nugent, Thomas A.	II-V C	Second Hand, Bigelow Carpet Company, Lowell, Mass.
Spedding, Ephraim H.	III C	Second Hand, Weave Room, Tremont and Suffolk Mills, Lowell, Mass.

Name	Course	Occupation
xStevenson, Wm.	II C	Supt. Franklin Woolen Mills, Franklin, Ky.
Stopherd, William H.	II-V C	Overseer, Bigelow Carpet Co., Lowell, Mass.
Swift, Edward S.	V C	Cotton Yarn Salesman, Catlin and Co., Boston, Mass.
Wilmot, William	III C	Designer Hamilton Web Co., Hamilton, R. I.
xWilton, George H.	III C	Overseer Designing, M. T. Stevens and Sons Co., No. Andover, Mass.

### Day Course, 1900.

Name	Course	Occupation
Baldwin, Arthur L.	IV D	Chemist, Lowell, Mass.
Barr, I. Walwin	I D	Designer, Lawrence and Company, New York City.
Bodwell, Henry A.	II D	Supt. Smith and Dove Mfg. Company, Andover, Mass.
Brickett, Chauncey J.	II D	Asst. Prin. International Correspondence School, New Bedford, Mass.
Burrage, Katherine C.	P. G. IIIb C	See Day Course, 1899.
Campbell, Laura E.	IIIb C	Designer, Lowell, Mass.
xHarrison, Mrs. Amy H. (Goodhue)	IIIb C	Dracut, Mass.
Lakeman, Fannie S.	IIIb C	Designer, Salem, Mass.
Lamson, George F.	I D	Draughtsman, Brighton Mills, Passaic, N. J.
xLeach, John P.	I-V C	Foreman Carding Dept., Harriet Cotton Mills, Henderson, N. C.
Merchant, Edith C.	IIIb C	Designer, Lowell, Mass.
xParker, Harry C.	V C	Salesman, Enfield, N. H.
Perkins, John N.	III D	Asst. Supt. and Designer, S. W. and C. Russell Woolen Mills, Pittsfield, Mass.
Pradel, Alois J.	III D	Designer, Montrose Mills, Woonsocket, R. I.
Sleeper, Robert R.	IV D	With H. A. Metz and Co., New York City.
Smith, Stephen E.	I D	Head Instructor, Cotton Dept., Lowell Textile School, Lowell, Mass.
Stewart, Arthur A.	II D	Head Instructor, Finishing, Lowell Textile School, Lowell, Mass.
Syme, James F.	II D	Agent Ray's Mills, (American Woolen Co.) Franklin, Mass.
Thompson, Henry J.	IV D	Dyer, Boston Rubber Shoe Company, Malden, Mass.
Woodies, Ida A.	IIIb C	Asst. Instructor, Art. Dept., Lowell Textile School, Lowell, Mass.

### Evening Course, 1900.

Name	Course	Occupation
Campbell, Albert D.	IIb C	Section Hand, Arlington Mills, Lawrence, Mass.
Cawthra, Albert B.	Ib C	Overseer Worsted Spinning, U. S. Bunting Co., Lowell, Mass.
Colby, Arthur D.	I C	Draftsman, Lowell Machine Shop, Lowell, Mass.

Name	Course	Occupation
xDonnelly, James	I C	Second Hand, Mule Room, Stark Mill No. 6, Manchester, N. H.
Elston, Fred R.	III C	Head Designer, Fitchburg Mills, Fitchburg, Mass.
Howard, John	V C	Overseer of Weaving, Belvidere Woolen Mill No. 2, Lowell, Mass.
Hutton, Clarence	V C	Director Textile Dept., Am. School of Correspondence, Chicago, Ill.
Jones, William J.	IIb C	Overseer, Worsted Spinning, U. S. Bunting Co., Lowell, Mass.
Maden, Harry	IIb C	Section Hand, U. S. Bunting Company, Lowell, Mass.
Nelson, Ernest H.	IIb C	Pattern Weaver, Mass. Cotton Mills, Lowell, Mass.
Ogley, Samuel A.	IIb C	Overseer, Worsted Spinning, Moore Spinning Co., No. Chelmsford, Mass.
Osgood, Charles F.	I C	Draftsman, Library Bureau, Boston, Mass.
*Rowell, Herman C.	I-IIb C	
Silcox, Arthur E.	I C	Draftsman, Lowell Machine Shop, Lowell, Mass.
Snow, Fred L.	IV C	Overseer Dyeing and Bleaching, Lawrence Mfg. Co., Lowell, Mass.
xWardrobe, Wm. L.	I C	Lawrence, Mass.
xWaterhouse, Joseph	IV C	Section Hand, Merrimack Print Works, Lowell, Mass.
Wing, Charles T.	III C	Asst. Supt., Middlesex Mfg. Company Lowell, Mass.
Woodbury, W. Sanford	I C	Overseer Carding, Dana Warp Mills, Westbrook, Me.

#### Day Course, 1901.

Name	Course	Occupation
Bradley, Richard H.	V C	Instructor, Lorraine Textile School, Pawtucket, R. I.
Buchan, Donald C.	II D	Overseer Weaving, Atlas Linen Company, Meredith, N. H.
Currier, John A.	II D	Asst. Supt. Franklin Mills, Franklin Falls, N. H.
Ewer, Nathaniel T.	IV D	Chemist, American Dyewood Company, Boston, Mass.
Foster, Clifford E.	II D	Overseer Carding, Bigelow Carpet Co., Lowell, Mass.
xHarrison, Mrs. Amy H. (Goodhue)	P. G. IIIb C	See Day, 1900.
Kingsbury, Percy F.	IV D	Asst. Color Maker, Hamilton Print Works, Lowell, Mass.
Marinel, Walter N.	I D	Draftsman, Fore River Ship Building Co., Quincy, Mass.
Minge, Jackson C.	I-V C	Sec.-Treas. Minge Mfg. Co., Demopolis, Ala.
Moorhouse, William R.	IV D	Color Chemist, Cassella Color Company, Boston, Mass.
Parker, B. Moore	I D	Instructor Carding and Spinning, Clemson College, S. C.
Pratt, Albert S.	I	Agent Edwards Mfg. Co., Augusta, Me.
Webber, Arthur H.	IV D	Chemist, F. E. Atteaux and Company, Boston, Mass.

Name	Course	Occupation
Wise, Paul T.	II D	Supt. Brookside Worsted Mills, West Chelmsford, Mass.
Woodies, Ida A.	P. G. IIIb C	See Day, 1900.

### Evening Course, 1901.

Name	Course	Occupation
xAspinwall, William	IIb C	Overseer Drawing, Southwark Mills, Philadelphia, Pa.
*Berry, Frank M.	V C	
xBrooks, Noah	III-V C	Lowell, Mass.
xBurghardt, Paul C.	IIa C	Second Hand, Card Room, Merrimack Woolen Co., Lowell, Mass.
Buzzell, Wm. O.	III C	Loom-fixer, Dartmouth Mfg. Company, New Bedford, Mass.
Cheetham, John James	III C	Spinning Room, Mass. Cotton Mills, Lowell, Mass.
Chippindale, Ernest W.	IIb C	Second Hand, Combing, Moore Spinning Co., No. Chelmsford, Mass.
Cowdell, Herbert	V C	Loom-fixer, Mass. Cotton Mills, Lowell, Mass.
Davis, Henry	IIb C	Overseer, Worsted Carding, Hudson Worsted Co., Hudson, Mass.
xDonovan, Daniel F.	IIa C	Second Hand, Woolen Carding, Yonkers, N. Y.
Evison, Wm. A.	V C	Loom-fixer, Prescott Mills, Lowell, Mass.
Farrell, Thomas	IIa C	Woolen Spinner, Stirling Mills, Lowell, Mass.
xFrame, Wm.	V C	Loom-fixer, Lowell, Mass.
Gagan, John H.	V C	Overseer, Stirling Mills, Lowell, Mass.
Grant, Archibald	IIb C	Section Hand, Spinning, Bigelow Carpet Co., Lowell, Mass.
Grouke, Michael	IIb C	Section Hand, Brussels Dept., Bigelow Carpet Co., Lowell, Mass.
Hill, Daniel	IIb C	Worsted Spinner, Maine Alpaca Co., Springvale, Me.
Hitchcock, Thomas B.	I-II-III C	Publishing, Grafton Press, New York City.
xHolgate, Charles H.	IIa C	Salesman, Selmar Hess, New York City.
Hunter, Ralph	III C	Salesman, Hall, Hartwell and Company, Troy, N. Y.
Jones, William J.	IIa C	See Evening, 1900.
Killerby, Walter	IIb C	Overseer, Park Worsted Mills, Lowell, Mass.
Law, Alfred	IIb C	Section Hand, Arlington Mills, Lawrence, Mass.
xLord, Wilfred	III C	Asst. Designer, Lower Pacific Mills, Lawrence, Mass.
McQuade, Hugh B.	V C	Loom-fixer, Bigelow Carpet Company, Lowell, Mass.
Minge, Jackson C.	III C	See Day, 1901.
Morris, Frank A.	V C	Loom-fixer, Stirling Mills, Lowell, Mass.
Nelson, Ernest H.	IIa C	See Evening, 1900.
Noble, John T.	III C	See Evening, 1899.
xPeel, Hudson	IIb C	Section Hand, Arlington Mills, Lawrence, Mass.

Name	Course	Occupation
Reynolds, Hiram L.	III C	Overseer, Merrimack Mfg. Company, Lowell, Mass.
xSaunders, Edward B.	III C	Second Hand, Weave Room, Fall River Iron Works, Fall River, Mass.
Scanlon, Edward J.	IIb C	Coal and Wood Dealer, Lawrence, Mass.
Shannon, Philip J.	V C	Loom-fixer, Belvidere Woolen Company, Lowell, Mass.
xSmith, Fred	IIb C	Overseer, Washington Mills, Lawrence, Mass.
Swift, Edward S.	I C	See Evening, 1899.
Wesson, Paul B.	I C	Foreman, Lowell Machine Shop, Lowell, Mass.
xWhitehead, Bennett	IIb C	Second Hand, Worsted Spinning, Arlington Mills, Lawrence, Mass.
Wiley, Frank S.	I C	Second Hand, Carding, Upper Pacific Mills, Lawrence, Mass.
Williamson, Isaac F.	IV C	Asst. Dyer, Hamilton Mfg. Company, Lowell, Mass.

#### Day Course, 1902.

Name	Course	Occupation
Burnham, Frank E.	IV D	Avery Chemical Co., Littleton, Mass.
Carter, Robert A.	IV D	Supt. Bleaching Station, Roessler and Hasslacher Chemical Co., Perth Amboy, N. J.
Craig, Clarence E.	III D	Auditor, Meriden Dairy Company, Kansas City, Mo.
Curran, Charles E.	III C	Head Designer, Wood Worsted Mill, Lawrence, Mass.
Ferguson, Arthur F.	I C	Instructor, Design Dept., Lowell Textile School, Lowell, Mass.
xHarris, George S.	I C	Supt. Sycamore Mills, Sycamore, Ala.
Haskell, Walter F.	IV D	Overseer of Dyeing, Dana Warp Mills, Westbrook, Me.
Holgate, Benj.	III C	Cost Finder, Boott Mills, Lowell, Mass.
Ramsdell, Theodore E.	I D	Agent, Monument Mills, Housatonic, Mass.
Swift, Edward S.	III D	See Evening, 1899 and 1901.
Wing, Charles T.	III D	See Evening, 1900.
Woodman, Harry L.	I C	Draftsman, Mass. Cotton Mills, Lowell, Mass.

#### Evening Course, 1902.

Name	Course	Occupation
xAdams, Wm. R.	IIa C	Pressman, Stevens Mills, No. Andover, Mass.
xBarlow, Robert	V C	Finishing Dept., Hamilton Mfg. Co., Lowell, Mass.
Binns, Heaton	VI C	See Evening, 1899.
Bowring, George P. B.	VI C	Machinist, Lowell Machine Shop, Lowell, Mass.
xBrainerd, Irving L.	I C	Overseer, Carding, W. L. Barrell and Co., Lawrence, Mass.



Name	Course	Occupation
xBurghardt, Edward S.	IIa C	Lawrence, Mass.
Buzzell, Wm. O.	P. G. III C	See Evening 1901.
Cheetham, John James	P. G. III C	See Evening 1901.
Collier, John	P. G. III C	See Evening 1899.
xCowdrey, Charles E.	V C	Pattern Weaver, Talbot Mills, No. Bil- lerica, Mass.
xCremin, Daniel J.	I C	Second Hand, Boott Cotton Mill, Lowell, Mass.
Donnellan, Frank T.	IIa C	Percher, Chicago, Ill.
xDudley, George E.	I C	Third Hand, Carding, Mass. Mills, Lowell, Mass.
Ferguson, Thomas	V C	Loom-fixer, Appleton Mills, Lowell, Mass.
xField, Charles W.	VI C	Draftsman, C. F. Morrill, Somerville, Mass.
xForrest, Fred G.	IIa C	Finishing Room, Middlesex Co., Lowell, Mass.
xFortune, David A.	IIb C	Section Hand, Worsted Spinning, Lower Pacific Mills, Lawrence, Mass.
Gaunt, Alfred C.	P. G. III C	See Evening 1899.
Good, Henry	I C	Providence, R. I.
xHaigh, Walter	III C	U. S. Bunting Co., Lowell, Mass.
Haworth, Joseph	VI C	Machinist, Lamson Consolidated Store Service Co., Lowell, Mass.
xHogan, James A.	V C	Lowell, Mass.
Hoyle, Edward	IIb C	Asst. Supt. Moore Spinning Company, No. Chelmsford, Mass.
Johnson, Ernest A.	IIa-b C	Asst. Supt. Yarn Dept., Washington Mills, Lawrence, Mass.
Kelley, Michael H.	I C	Second Hand, Card Room, Appleton Co., Lowell, Mass.
Kent, Ernest J.	IIb C	Section Hand, Worsted Spinning, Lower Pacific Mills, Lawrence, Mass.
Lamont, Walter M.	IIb C	Supt. Worsted Yarn Dept., Wood Worsted Mill, Lawrence, Mass.
Lawliss, Augustine J.	V C	Overseer Weaving, Belvidere Woolen Co., Lowell, Mass.
Lee, Charles	I C	Machinist, Lowell Machine Shop, Lowell, Mass.
Leith, Edwin E.	III C	Supt. Franklin Woolen Mills, Franklin, Ky.
Libby, C. Robert	VI C	Draftsman, Lamson Consolidated Store Service Co., Lowell, Mass.
Molloy, Andrew	V C	Overseer of Spooling, Tremont and Suf- folk Mills, Lowell, Mass.
Nugent, Thomas A.	VI C	See Evening 1899.
Osgood, Charles F.	VI C	See Evening 1900.
Potter, Richard W.	V C	Second Hand Weaving, Mass. Cotton Mills, Lowell, Mass.
Rockwell, Samuel F.	IIa C	Machinist, Davis and Furber Machine Co., No. Andover, Mass.
Schermerhorn, George E.	I C	Overseer Carding and Combing, Chas. Chipman's Sons, Easton, Pa.
Smith, William H.	IIb C	Postal Clerk, Postoffice, Lawrence, Mass.
Stevenson, William	III C	See Evening 1899.
Stopherd, William H.	VI C	See Evening 1899.

Name	Course	Occupation
Umpleby, Thomas B.	V C	Asst. Supt., Lyman's Mills, Lyman-ville, R. I.
Varney, Manley H.	III C	Overseer, Cloth Room, Amory Mfg. Co., Manchester, N. H.
xVogt, Alfred H.	III C	Designing Room, George E. Kunhardt, Lawrence, Mass.
Walker, David	III C	Overseer Beaver Brook Mills, Collinsville, Mass.
xWilson, Calvin E.	IIb C	Third Hand Twisting, Arlington Mills, Lawrence, Mass.
Wilson, George H.	IIb C	Section Hand, Twisting, Lower Pacific Mills, Lawrence, Mass.
Wood, Jonathan	I C	Overseer Spinning, Chas. Chipman's Sons, Easton, Pa.

### Day Course, 1903.

Name	Course	Occupation
Bennett, Edward H.	V C	F. P. Bennett and Co., New York City.
Bloom, Wilfred N.	IV D	Asst. Mgr., Read, Holliday and Sons, Ltd., New York City.
Campbell, Orison S.	II D	With American Felt Co., Dolgeville, N. Y.
Campbell, Louise P.	IIIb C	Designer, Lowell, Mass.
Chamberlin, Frederick E.	I D	Asst. Supt., China, Webster and Pembroke Mills, Suncook, N. H.
Emerson, Frank W.	II D	Asst. to Agent, Moosup Mills, Moosup, Conn.
xEvans, Alfred W.	III D	Arlington Mills, Lawrence, Mass.
xEvans, William R.	III D	Bradford, Mass.
Ferguson, Arthur F.	I D	See Day Course 1902.
xFuller, George	I D	Designer, Eclipse Mills, Arnold Print Works, No. Adams, Mass.
Gerrish, Walter	III D	Aetna Mills, Watertown, Mass.
Holgate, Benj.	V C	See Day 1902.
Hutton, Clarence	III C	See Evening 1900.
Morrison, Fred C.	I D	Clerk, L. W. Phelps, Ayer, Mass.
Najarian, Garabed	IV D	Overseer of Dyeing, Monument Mills, Housatonic, Mass.
Petty, George E.	I-V C	Shipping Clerk, Wiscasset Mill Co., Albemarle, N. C.
*Rasche, Wm. A.	III D	
Reynolds, Isabel H.	III-V C	Student, Lowell Textile School, Lowell, Mass.
Robinson, Wm. C.	III-V C	Asst. Designer, Solway Mills, Westerly, R. I.
Snelling, Fred N.	II D	With American Express Co., Haverhill, Mass.
xSpiegel, Edward	V C	Wool Sorting, U. S. Bunting Company, Lowell, Mass.
Stevenson, Murray R.	III-V C	Asst. Designer, Russell Mfg. Company, Middletown, Conn.
Stewart, Walter L.	III D	Designer, Clarence Whitman and Co., New York City.
Walker, Anna G.	IIIb C	Teacher of Painting, Lowell, Mass.

Name	Course	Occupation
Wilson, John S.	II D	Designer, U. S. Bunting Co., Lowell, Mass.

### Evening Course, 1903.

Name	Course	Occupation
Adams, Henry S.	IIa C	Gen. Mgr. and Secretary, Dundee Textile Co., Passaic, N. J.
Balmforth, James H.	IIa C	Electrician, Westinghouse Electric and Mfg. Co., Newark, N. J.
Balmforth, Martha B.	III C	No. Billerica, Mass.
Barry, Edward J.	III C	Overseer Weaving, Acushnet Mills, New Bedford, Mass.
Bastow, Henry	III C	Warp Dresser, Arlington Mills, Lawrence, Mass.
xBaxter, Alvah J.	IIa C	Bookkeeper, Assabet Mills, Maynard, Mass.
Byam, Walter S.	VI C	Machinist, Lowell Machine Shop, Lowell, Mass.
Cady, Dennis J.	V C	Loom-fixer, Washington Mills, Lawrence, Mass.
Donnellan, Frank T.	V C	See Evening 1902.
Flynn, John J.	VI C	Bookkeeper, Coffey Bros., Lowell, Mass.
xGarner, William	III C	Foreman of Refinery, Warren Bros. Co., Washington, D. C.
Gaunt, Alfred C.	IIa C	See Evening, 1899.
Goodchild, George	I C	Draftsman, Lowell Machine Shop, Lowell, Mass.
Gray, Finley M.	VI C	Machinist, Lowell Machine Shop, Lowell, Mass.
xHiggins, James A.	IIa C	Spinning, Talbot Mills, No. Billerica Mass.
Howard, John	III C	Overseer Weaving, Belvidere Woolen Co., Lowell, Mass.
Hunter, Ralph	V C	See Evening 1901.
Jennings, James J.	III C	Designer, Lyman Mills, Holyoke, Mass.
Johnson, Samuel L.	V C	Second Hand Weaving, Arlington Mills, Lawrence, Mass.
xKeleher, John J.	IIb C	Section Hand, Washington Mills, Lawrence, Mass.
Knowles, Frank E.	I C	Overseer, Tremont and Suffolk Mills, Lowell, Mass.
xLawrence, Charles	I C	Overseer, Mule Spinning, Merrimack Mfg. Co., Lowell, Mass.
xLeach, Joseph W.	V C	Lawrence, Mass.
Lincourt, Hector L.	VI C	Machinist, C. T. Rowland, Lowell, Mass.
xLord, Wilfred	IIb C	See Evening 1901.
Mason, Frederick A.	I C	Mule Spinner, Saxony Worsted Mills, Newton, Mass.
Mortenson, Carl W.	III C	Asst. Paymaster, Talbot Mills, No. Billerica, Mass.
Moir, Alexander L.	P. G. III C	See Evening, 1899.
Mozley, Arthur	VI C	Electrical Machinist, Heinze Electric Co., Lowell, Mass.
Myers, James W.	III-IV C	Clerk, U. S. Bunting Co., Lowell, Mass.

Name	Course	Occupation
Nicholson, Richard	IIb C	Section Hand, Washington Mills, Lawrence, Mass.
Noonan, Denis T.	III C	Asst. Supt., Knoxville Woolen Mills, Knoxville, Tenn.
xPalmer, G. Buel	III C	Lowell, Mass.
Rockwell, Henry D.	IIa C	Clerk, Davis and Furber Machine Co., Andover, Mass.
xSchofield, John S.	III C	Pattern Weaver, G. E. Kunhardt, Lawrence, Mass.
Schoon, Fenton	IIb C	Section Hand, Drawing, Pacific Mills, Lawrence, Mass.
Stokham, Burton I.	IV C	Asst. Chemist, Bigelow Carpet Company, Lowell, Mass.
Tonge, Matthew	III C	Weaver, Dartmouth Mfg. Co., New Bedford, Mass.
Upton, Frank A.	I C	Carder, Boott Mills, Lowell, Mass.
Varney, Manley H.	I C	See Evening, 1902.
Walker, David	P. G. III C	See Evening, 1902.

#### Day Course, 1904.

Name	Course	Occupation
Abbott, Edward M.	II D	With A. J. Cameron Co., Boston, Mass.
Baldwin, Frederick A.	II D	With Washington Mills, Lawrence, Mass.
Clapp, F. Austin	II D	Styler, L. F. Dommerich & Co., New York City.
Clogston, Raymond B.	IV D	Arnold Print Works, No. Adams, Mass.
Culver, Ralph F.	IV D	Associate Dyer, Arnold Print Works, No. Adams, Mass.
Cutler, Benjamin W., Jr.	III D	Selling Agent, Catlin and Company, New York City.
Dewey, James F.	II D	Asst. to Supt. Dewey's Mills, Quechee, Vt.
Donald, Albert E.	II D	Asst. Supt. Yarn Dept., Wood Mill, Lawrence, Mass.
Halsell, Elam R.	I C	With Appleton Mills, Lowell, Mass.
Horsfall, George G.	II C	Asst. Designer, Martinsburg Worsted and Cassimere Co., Martinsburg, W. Va.
Jones, Everett A.	II C	Designer, Brighton Mills, Passaic, N. J.
Jury, Alfred E.	IV D	Chemist, Washington Mills, Lawrence, Mass.
Lucey, Edmund A.	II D	Cost Finding, Brighton Mills, Passaic, N. J.
MacPherson, Wallace A.	III D	No. Adams, Mass.
Meadows, Wm. R.	I D	Director, Miss. Textile School, Agricultural College, Miss.
O'Donnell, John D.	I C	Clerk, Otis Co., Ware, Mass.
O'Hara, Wm. F.	IV C	Chemist, Manchester Print Works, Manchester, N. H.
Parker, Everett N.	I C	Lowell, Mass.
xSmith, Ralston F.	I C	Machine Erector, Lowell Machine Shop, Lowell, Mass.
Stevens, Dexter	I D	Designer, Parkhill Mfg. Co., Fitchburg, Mass.

Name	Course	Occupation
Toovey, Sidney E.	II C	Percher, Talbot Mills, No. Billerica, Mass.
Webb, Frank H.	IV D	Chemist, William Wanton Dunnell, Ap- ponaug, R. I.
White, Royal P.	II D	Supt., Stirling Mills, Lowell, Mass.
Wilson, Walter E. H.	I C	Machinist, Lowell, Mass.

### Evening Course, 1904.

Name	Course	Occupation
Adams, Michael E.	VI C	Bookkeeper, Lowell, Mass.
Balmforth, James H.	IIb C	See Evening, 1903.
Balmforth, Wm. F.	VI C	No. Billerica, Mass.
Barker, John P.	V C	Lowell, Mass.
Barrington, John A.	IV C	Expert Dyer, Continental Color and Chemical Co., Boston, Mass.
xBoucher, John L.	VI C	Lowell, Mass.
xButler, Benj. O.	VI C	Machinist, Lowell Machine Shop, Lowell, Mass.
xCallahan, Patrick A.	VI C	Lower Pacific Mills, Lawrence, Mass.
xCheetham, John Joseph	I C	Asst. Carder, Mass. Mills, Lowell, Mass.
xConley, Frederick A.	VI C	Machinist, Kitson Machine Co., Lowell, Mass.
Connors, Edward F.	VI C	Draftsman, Shaw Machine Co., Lowell, Mass.
Davis, Prentice T.	I C	Overseer, Carding and Picking, Boott Mills, Lowell, Mass.
Delmage, Edward R.	III C	Overseer Weaving, Thomas Kent Mfg. Co., Clifton Heights, Pa.
Dempsey, John W.	IIa C	Spinner, Bigelow Carpet Co., Lowell, Mass.
Donahue, Michael F.	VI C	Second Hand, Lowell Machine Shop, Lowell, Mass.
xDoole, George L.	VI C	Weaver, U. S. Bunting Co., Lowell, Mass.
Dooley, Edward W.	VI C	With Spencer and Co., Lowell, Mass.
Duggan, Francis P.	VI C	Second Hand, U. S. Cartridge Company, Lowell, Mass.
Frank, Emil M.	III C	Asst. Designer, Arlington Mills, Law- rence, Mass.
Gaunt, Alfred C.	IIb C	See Evening, 1899.
Hempel, Frank	V C	Weave Room Hand, Washington Mills, Lawrence, Mass.
Higgins, James A.	IIb C	See Evening, 1903.
Hoyle, Joseph	IIb C	Section Hand, Moore Spinning Company, No. Chelmsford, Mass.
Jeannotte, Arthur	VI C	Bigelow Carpet Co., Lowell, Mass.
xKershaw, Wm. E.	V C	Weaver, Talbot Mills, No. Billerica, Mass.
Langevin, Felix D.	VI C	Asst. Supt., Kitson Machine Company, Lowell, Mass.
xLord, Harry D.	III C	Lowell, Mass.
Lord, Wilfred	IIa C	See Evening, 1901.
McBride, Robert G.	IIa C	Mule fixer, Bay State Mills, Lowell, Mass.
Merrill, Edwin C.	VI C	Draftsman, City Hall, Lawrence, Mass.

Name	Course	Occupation
Miller, Emil H.	V C	Loom-fixer, Lower Pacific Mills, Lawrence, Mass.
Moorehouse, Thomas	VI C	Student, Phillips Academy, Andover, Mass.
Murphy, John H.	VI C	Salesman, Putnam and Son Co., Lowell, Mass.
Notman, Frederick W.	I C	Clerk, Mass. Cotton Mills, Lowell, Mass.
Patrick, Alexander	III C	Weaver, Harriman Suspender Factory, Lowell, Mass.
Redman, Henry S.	III C	Tracing Clerk, Appleton Mills, Lowell, Mass.
xReed, Foster C. K.	VI C	Engineer, Farwell Bleachery, Lawrence, Mass.
Rhodes, Joseph E.	V C	Wire Sharpener, Mass. Mohair Plush Co., Lowell, Mass.
Rooney, George W.	I C	Second Hand, Hamilton Mfg. Company, Lowell, Mass.
Shaw, James	V C	Weaver, Plush Mill, Lowell, Mass.
Smith, Edward	I C	Second Hand, Boott Mills, Lowell, Mass.
Smith, John W.	IIb C	Section Hand, Worsted, Arlington Mills, Lawrence, Mass.
xSterling, Walter	III C	Lowell, Mass.
Stokham, Burton I.	P .G. IV C	See Evening, 1903.
Tarpey, John F.	IIa C	With Merrimack Mfg. Co., Lowell, Mass.
Thompson, Charles B.	VI C	With Lamson Consolidated Store Service Co., Lowell, Mass.
Webb, Francis H.	V C	Quiller, Mass. Mohair Plush Mills, Lowell, Mass.

### Day Course, 1905.

Name	Course	Occupation
Adams, Henry S.	I D	See Evening, 1903.
Arundale, Henry B.	II-III-V C	Asst. Instructor, Lowell Textile School, Lowell, Mass.
Boyd, George A.	I D	Office Mgr., Chicopee Mfg. Co., Chicopee Falls, Mass.
Cafr, George E.	I D	Third Hand, Dana Warp Mills, Westbrook, Me.
Cole, James T.	II D	Instructor, Experimental Station for the Trade Training of the Blind, Cambridge, Mass.
Conklin, Jennie G.	IIIb C	Designer, Boston, Mass.
Curtis, William L.	II C	Clerk, Parker, Wilder and Co., Boston, Mass.
Dillon, James H.	III D	Library Bureau, Boston, Mass.
Harris, Charles E.	I D	West Boylston Mfg. Co., Easthampton, Mass.
Hollings, James L.	I D	Asst. Designer, Am. Mills Co., Waterbury, Conn.
Hook, Russell W.	IV D	Asst. Instructor, Lowell Textile School, Lowell, Mass.
Hunt, Chester L.	III C	Asst. Designer, Knoxville Woolen Mills, Knoxville, Tenn.
Jones, Everett A.	III D	See Day Course, 1904.
Lee, William H.	V C	With Shaw Machine Co., Lowell, Mass.



Name	Course	Occupation
Lewis, Walter S.	IV D	Head Chemist, Hollingsworth and Vose, East Walpole, Mass.
McKenna, Hugh F.	IV D	Chemist, Manchester Mills, Manchester, N. H.
Midwood, Arnold J.	IV D	Second Hand, Dyehouse, Sulloway's Mills, Franklin Falls, N. H.
Moore, Everett B.	I D	Clerk, Boott Mills, Lowell, Mass.
Parker, Everett N.	I D	See Day Course, 1904.
xRoberson, Pat H.	I C	Lowell, Mass.
Roberts, Carrie I.	IIIb C	Designer, Lowell, Mass.
xThomas, Roland V.	I C	Carder, Atlanta, Ga.
xThompson, Everett L.	I D	Draftsman, Associated Factory Mutual Fire Ins. Co., Boston, Mass.
Warren, Philip H.	II D	With Stanley Woolen Co., Uxbridge, Mass.
Wheelock, Stanley H.	II D	Asst. Designer, Stanley Woolen Company, Uxbridge, Mass.
Wright, Edward, Jr.	II C	Worsted Dept., Arlington Mills, Lawrence, Mass.

#### Evening Course, 1905.

Name	Course	Occupation
Bake, Herbert	III C	Carpenter, Lawrence, Mass.
Bastow, Henry	V C	See Evening, 1903.
xBell, Frederick W.	IIa C	Spinner, Stirling Mills, Lowell, Mass.
Bowie, Samuel A.	VI C	Engineer, Pacific Mills, Lawrence, Mass.
Brown, James P.	III C	With Merrimack Mfg. Co., Lowell, Mass.
Bryant, Ernest L.	VI C	Clerk, W. T. S. Bartlett, Lowell, Mass.
Burke, Thomas F.	I C	Clerk, Lowell, Mass.
Burns, Edward J.	IV C	Tester, U. S. Cartridge Co., Lowell, Mass.
Burns, James E.	IV C	Testing Laboratory, U. S. Cartridge Co., Lowell, Mass.
Caron, Cleophas	I C	Second Hand Spinning Dept., Queen City Cotton Co., Burlington, Vt.
Collins, John A.	IIa-b C	Clerk, Arkwright Mutual Fire Ins. Co., Boston, Mass.
xCook, Cheney E.	III C	Woonsocket, R. I.
Custer, James J.	V C	Woolen Weaver, Talbot Mills, North Billerica, Mass.
Dana, Clarence A.	VI C	Draftsman, Lowell Machine Shop, Lowell, Mass.
Dick, Hugo P.	III C	Loom-fixer, Lower Pacific Mills, Lawrence, Mass.
Dimlick, Benj. C.	III C	Clerk, Champion International Company, Lawrence, Mass.
Erbe, Gustave	VI C	Machinist, Beckett and Hammond, Haverhill, Mass.
Foster, Sherwood L.	I C	Order Clerk, General Electric Company, Boston, Mass.
xFrench, Ernest J.	I C	Clerk, Upper Pacific Mills, Lawrence, Mass.
Gay, Earle B.	I C	Second Hand Carding, Dana Warp Mills, Westbrook, Me.
Goodchild, George	VI C	See Evening, 1903.

Name	Course	Occupation
Harder, Elmer E.	VI C	Janitor, Highland School, Lowell, Mass.
xHaven, George W.	III C	With Blake and Stearns, Boston, Mass.
Howard, Thomas	V C	Overseer, Warping and Winding, Harri- man Mfg. Co., Lowell, Mass.
Hunt, Herbert R.	VI C	Asst. Chief Draftsman, DeLamar's Cop- per Refinery Co., Chrome, N. J.
xHunton, Lewis G.	IV C	Lowell, Mass.
Kenworthy, Joseph	I C	Section Hand, Mass. Mfg. Co., Lowell, Mass.
Kimball, Irving D.	VI C	Patent Dept., Lowell Machine Shop, Lowell, Mass.
Lamson, George F.	VI C	See Day Course, 1900.
Linkletter, Alfred C.	VI C	Steamfitter, H. R. Barker Mfg. Company, Lowell, Mass.
Lovell, Charles E.	VI C	Los Angeles, Cal.
Maguire, James H.	VI C	Machinist, Lowell Machine Shop, Lowell, Mass.
Martin, John C., Jr.	IIa-b C	Tailor, J. C. Martin, Lowell, Mass.
McManus, Hugh	V C	With Middlesex Co., Lowell, Mass.
Molloy, Andrew	III C	See Evening, 1902.
O'Neill, Peter F.	IV C	Clerk, Pacific Mills, Lawrence, Mass.
Overend, John	V C	Hand Dresser, Arlington Mills, Law- rence, Mass.
Redman, Henry S.	V C	See Evening, 1904.
Silk, Frederick C. M.	IV C	Asst. Colorist, Bigelow Carpet Company, Lowell, Mass.
Simola, Emil J.	IIa-b C	Finland.
Skinner, Clarence W.	III C	Weaver, George E. Kunhardt, Lawrence, Mass.
Smith, Arthur	III C	Pattern Weaver, Pemberton Company, Lawrence, Mass.
Smith, George A.	III C	Overseer, Tremont Worsted Co., Me- thuen, Mass.
Smith, William E.	III C	Card Cutter, Arlington Mills, Lawrence, Mass.
Stevens, Frank W.	VI C	Draftsman, Locks and Canals, Lowell, Mass.
Stopherd, Wm. H.	III C	See Evening, 1899.
Tonge, John	IV C	Clerk and Second Hand, Steaming Dept. Pacific Mills, Lawrence, Mass.
Wilde, Thomas E.	IIa C	Stenographer, Jeremiah Clark Machin- ery Co., Lowell, Mass.
Wiswall, Frank T.	V C	Weaver, George E. Kunhardt, Lawrence, Mass.

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(DAY)

Fill out and send to Secretary

# Lowell Textile School

LOWELL, MASS.

## APPLICATION BLANK

Date.....

I,.....hereby  
apply for admission to the Lowell Textile School as DAY  
student.

Name in Full, .....

Date and Place of Birth, .....

Home Residence, .....

Parent or Guardian, .....

Residence of Parent, .....

School last attended, .....

( INDICATE COURSE )

- |                          |                           |
|--------------------------|---------------------------|
| I. Cotton Manufacturing. | II. Wool Manufacturing.   |
| III. Designing.          | IV. Chemistry and Dyeing. |
| VI Textile Engineering.  |                           |

Signature,.....

ENDORSEMENT BY OFFICER OF SCHOOL LAST ATTENDED

I hereby certify that.....  
the above applicant has completed the regular four years  
course at the..... High School.

Signed :.....

Principal ..... School, located  
at ..... State of .....

Date.....

FORM FOR EVENING CLASSES ON OTHER SIDE

(EVENING)

Fill out and send to the Secretary

# Lowell Textile School

LOWELL, MASS.

## APPLICATION BLANK

DATE.....

I, ..... hereby  
apply for admission to the Lowell Textile School as EVENING  
student.

Name in Full, .....

Date and Place of Birth, .....

Home Residence, .....

Parent or Guardian, .....

Residence of Parent, .....

School last attended, .....

(INDICATE COURSE)

- |                           |                               |
|---------------------------|-------------------------------|
| I. Cotton Spinning.       | V. Weaving.                   |
| II. a—Woolen Spinning.    | a—Cotton Weaving.             |
| b—Worsted Spinning.       | b—Woolen and Worsted Weaving. |
|                           | c—Dobby and Jacquard Weaving. |
| III. Designing.           | VI. Mechanical Engineering.   |
| IV. Chemistry and Dyeing. | VII. Finishing.               |

Signature, .....

ENDORSEMENT BY SOME OFFICER OF SCHOOL LAST ATTENDED

I hereby certify that .....  
the above applicant is duly qualified to pursue with profit the  
work of the Lowell Textile School.

SIGNED: .....

Principal ..... School, located  
at ..... State of .....

Date .....



# BULLETIN

OF THE

## Lowell Textile School

Lowell, Massachusetts, U. S. A.



ISSUED QUARTERLY

---

Entered Aug. 26, 1902, at Lowell, Massachusetts  
as second-class matter under Act of  
Congress, July 16, 1894

---

Moody Street and Colonial Avenue

OR BULLETIN AND TERMS ADDRESS CHAS. H. EAMES, SECRETARY.

## Additions and Improvements

---

The application for admission to the fall term of the Lowell Textile School, which begins on next Tuesday, September 25th, indicate an increase in the entering class of about twenty percent. This is very gratifying to the management as for two years it has been impossible to meet the demand for graduates from the mills, shops, and selling houses.

As the school is not an extensive advertiser, it would appear that the annually increasing roster is mainly due to the efficiency of the graduates in actual manufacture and their rapid advancement.

During the summer vacation further extensive additions have been made to the floor space and to the equipment, grounds, and instruction staff.

Twelve thousand square feet of floor space have been added to Kitson Hall, divided up into machine shop, cotton finishing, evening mechanical, architectural, and freehand drawing, and students room with toilet, shower baths, and lockers for the athletic clubs—also store rooms, etc. Twenty-five hundred feet of the basement of Southwick Hall have been partitioned off and fitted up for an industrial chemistry laboratory, where instruction in the making of dyes used at the school from the crude material will be given.

The installation of a \$12,000 plant for the French or Continental system of worsted spinning made by the Societe Alsacienne De Constructions Mecaniques of Alsace, Germany, purchased through Stoddard, Haserick, Richards & Co., Boston, Mass., has been completed. This, with a complete plant for the Bradford or English system of worsted spinning, heretofore installed, covers the entire field of worsted yarns.

Considerable additions have been made to the equipment of the other departments notably for knitting varied fabrics.

The popular department of engineering has been further strengthened by the addition to the instruction staff of Herbert J. Ball, S. B. Mechanical Engineer, Mass. Institute of Technology, and Louis F. Blume, S. B. Engineering, Electricity, Mathematics, and Physics, Lehigh University, and late with General Electric Co. Other additional instructors are Robert R. Sleeper, graduate Lowell Textile School, 1900, and late with H. A. Metz & Co., Manufacturing Chemists, New York. Frederick A. Wood, Professor of English, Dartmouth and Columbia, and Henry H. Crompton, expert in French Spinning, Lowell Textile School, and late of Arlington Mills, Lawrence.

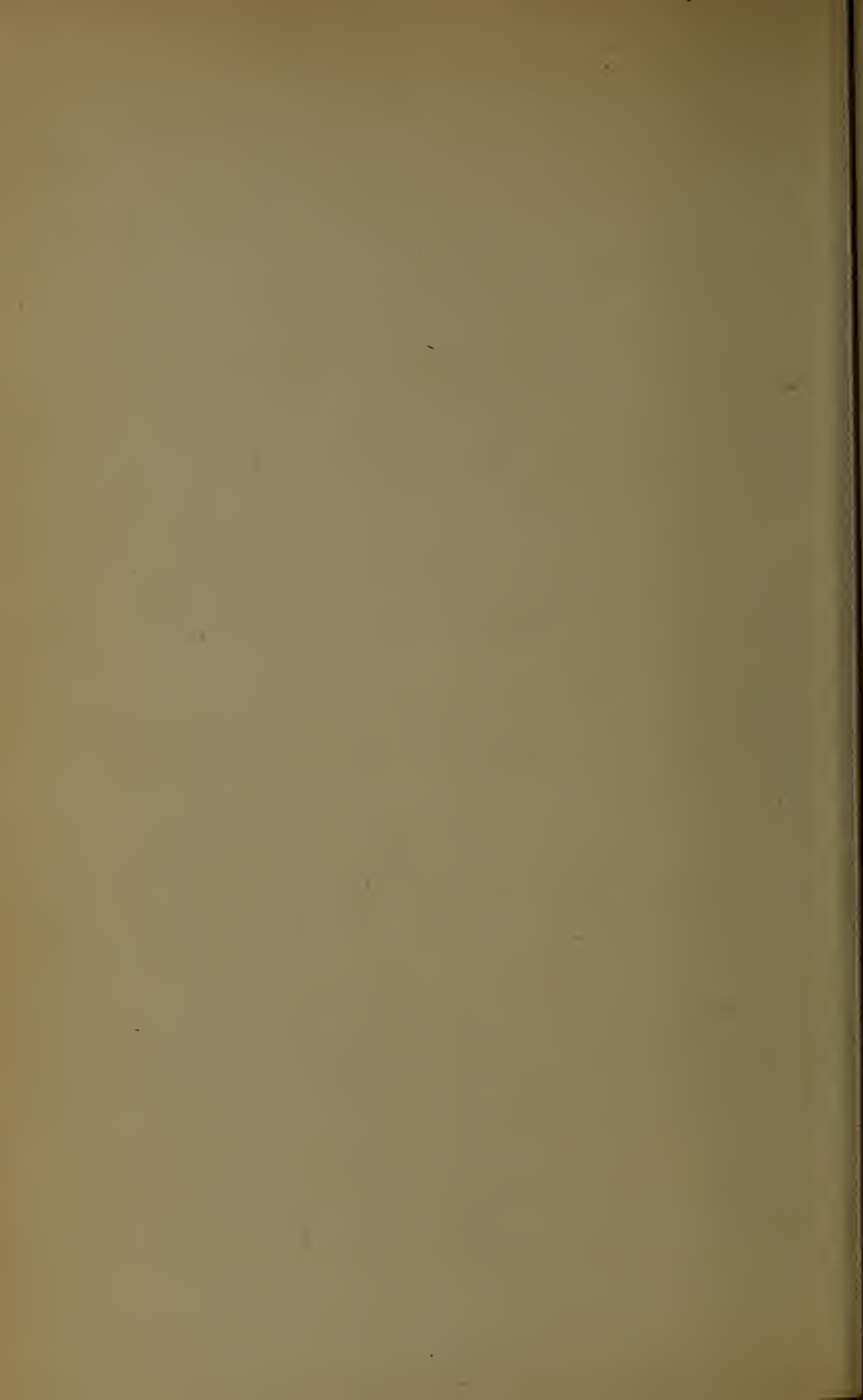
The school site has this year been increased to eighteen acres by three acres, the gift of Frederick Fanning Ayer, Esq., of New York City.

The growth of the school has required a thorough overhauling of the system of ventilation of class rooms and laboratories, and the installation at the expense of \$6,000 of a system prepared by George Huey, No. 7 Water Street, Boston, and approved by the District Police Bureau.

The school will, at the opening of the fall term be able to furnish evening students the same thorough courses as the day pupils, though of course, by reason of shorter hours given to instruction in the evening it will take even the brightest and most ambitious pupils more years to secure the diploma.

The school is now well represented by its graduates at the more prosperous mills and shops of Massachusetts and in the wool dealing, dyeing, and textile distributing houses of Boston and New York.

Mr. John R. Walmsley comes to us from the Pierce Manufacturing Company, of New Bedford, Mass., as instructor in the weaving department, bringing with him a wide experience in the manufacture of cotton fabrics.



# BULLETIN

OF THE

## Lowell Textile School

Lowell, Massachusetts, U. S. A.



ISSUED QUARTERLY

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Entered Aug. 26, 1902, at Lowell, Massachusetts  
as second-class matter under Act of  
Congress, July 16, 1894

---

Moody Street and Colonial Avenue

FOR BULLETIN AND TERMS ADDRESS CHAS. H. EAMES, PRINCIPAL

## The Trade School vs. Technical School

---

"The Trade School in the United States does not hold such an important place as it does in Europe. The cleavage lines in society are so clearly marked that the boy born to a lowly position in life is quite willing to banish ambition, to enter a trade school, and to become a skilled mechanic. With us the boundless ambition of the young American too often entices him to aspire beyond his capabilities and spurn a trade school. Also, the influence from pedagogical circles is so strongly exerted for a "symmetrical development" that trade schools are rated below educational par. However, the demand for them is keen and they are being established because of their economic value. There are six building and mechanical trade schools in New York and Brooklyn, three in Boston, two in San Francisco, and two in Philadelphia. New York has two brewing academies; Chicago and Milwaukee one each. Philadelphia, Lowell, New Bedford, and Atlanta have textile schools. Chicago, St. Louis, Omaha, Peoria, Waltham, Winona, and La Porte have watchmaking and engravers' schools. The universities of Wisconsin and Minnesota and the Iowa College of Agriculture have schools of dairying. For dressmaking, millinery, and the domestic arts and science, schools exist in Boston, New York, Brooklyn, St. Louis, and Philadelphia. Eight cities contain schools to teach telegraphers; Effingham, Ill. has a college of photography, and New York an academy for shipbuilders."

The above statement from the Scientific American Supplement Dec. 15, 1906, gives concisely the main reason for the failure of the truly trade school to rise to a position where it can receive consideration in the educational system of this country. Social status of any country must be taken into account



when studying the educational needs of a country or of a specific locality. The American youth always has been, and let us hope always will be, looking toward the achievement of the highest goal. Satisfaction comes only when that point is reached even if the ultimate position is a little short of the object point. Not so with the youth of the European countries, for there, family traditions or social standing influence, if not fix for him his life work, position, and salary. His early training is chosen with this end in view and if his career demands primarily manual skill, with a reasonable amount of intelligence, if his ultimate success depends upon his dexterity the opportunity to acquire this skill cannot be offered too early. The instruction given for this end must of necessity be limited to the particular trade, and hence, is to a great extent narrow. He is not compelled to know more than that required to give him experience in his special work. There is no demand for a broadening instruction or training that will permit the student to enter later some other field more or less connected with his own. This is contrary to the original intent and never enters the mind of the man whose position for life is early reached and whose ambition is as soon satisfied.

The American youth cannot appreciate the mind which becomes thus quickly satisfied. He is as free to choose his line of work as he is to exercise the right of free speech, or the privilege of citizenship. Any position is open to him but he is not certain what avenue will lead him directly to his goal; at exactly what point he must commence; what modifications of plans he will later be compelled to make, or what obstacles he must overcome. He does realize at the outset that his training should have breadth and solidity. As there are possibilities of his changing his actual vocation many times during his life he aims to acquire fundamental principles with so much of their practical application as will help to fix them in his mind, and he protects himself against any tendency to narrow or obscure his vision or to make him deviate from his chosen path to one having an end far below the one which he has set for himself. His skill acquired in the application of principles is but supplementary and while he appreciates such skill and proudly recognizes it as a part of his capital, he values more the permanent asset viz, his knowledge of the fundamental principles underlying the whole. It is this which will

improve with use, will expand without limit, and will return a greater interest in the end than can any investment of mere skill in manual manipulation.

This difference in the forecast between the career of the American youth and the young man in an European country differentiates the Technical from the Trade School.

It is the aim of the management of the Lowell Textile School to give the students as broad a technical training in the fundamental laws of science, their application and their adaptability to the needs of the textile industry as well as to a broad field of kindred and allied industries as the demands of those industries seem to indicate. It is the belief that this policy will result in greater benefit by raising the quality and quantity of the material manufactured as well as to increase the efficiency of the several processes of the industry.

Such a method at once finds its place in the educational system of this country, offers advanced training to the young men leaving the high school or academy and makes it possible for him to extend and make practical the preliminary training of these preparatory schools. This, as well as any technical school aims to make him of some economic value as early in his life as is consistent with a thoroughly well rounded education.

SERIES 10, NO. 3

BULLETIN  
OF THE  
Lowell Textile School  
LOWELL, MASS.

---

SPECIAL BULLETIN  
OF THE  
Chemistry and Dyeing Department

---

*Issued Quarterly*

---

Entered August 26, 1902, at Lowell, Mass., as second class matter,  
under act of Congress of July 16, 1894.

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*Moody Street and Colonial Avenue*

OFFICERS OF THE  
LOWELL TEXTILE SCHOOL.

A. G. CUMNOCK, *President*

JAMES T. SMITH, *Clerk*

A. S. COVEL, *Vice-President*

A. G. POLLARD, *Treasurer*

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Trustee's Committee on  
Chemistry and Dyeing Department

THOMAS WALSH (*Chairman*)

FREDERICK S. CLARK

CHARLES H. EAMES, S. B.  
*Principal of the School*

FOR BULLETIN AND TERMS ADDRESS CHAS. H. EAMES, PRINCIPAL.

## OFFICERS OF INSTRUCTION

---

### Chemistry and Dyeing Department

---

LOUIS A. OLNEY, A. C.  
*Professor of Chemistry and Dyeing.*

G. CARL SPENCER, S. B.  
*Instructor in Quantitative Analysis and Organic Chemistry*

JOHN B. REED, A. B.,  
*Instructor in General Chemistry and Qualitative Analysis*

ROBERT R. SLEEPER,  
*Instructor in Industrial Chemistry and Dyeing*

RUSSELL W. HOOK,  
*Instructor in Dyeing*

*Assistant Instructor in Chemistry*

W. E. HADLEY,  
*Laboratory Assistant*





**CHEMISTRY AND DYEING DEPARTMENT**  
of the  
**LOWELL TEXTILE SCHOOL.**

---

**INTRODUCTION**

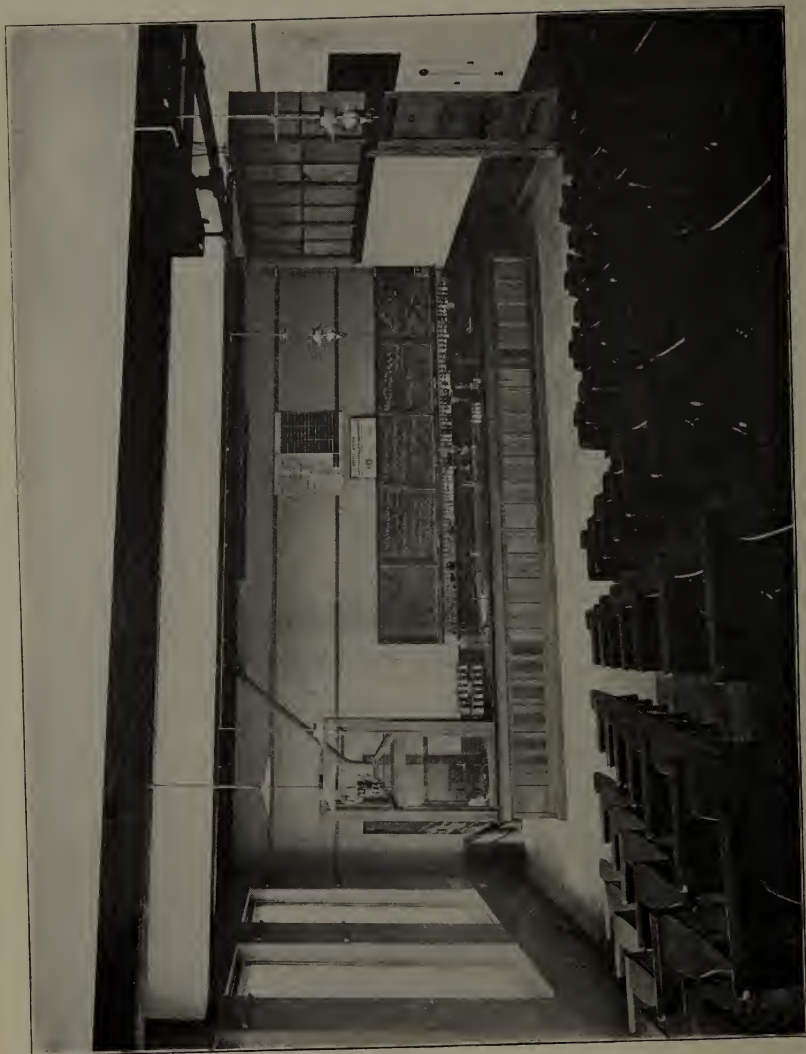
In June of the current year (1907) the Chemistry and Dyeing Department of the Lowell Textile School will have completed the first ten years of its development. It has therefore been considered an appropriate time to present to those associated with the textile industry, as well as those interested in general technical education, a brief account of the purpose of this department of the Lowell Textile School and the scope of its training together with an enumeration of the advantages it offers to the students.

The course of study outlined on the following pages is the result of ten years study and observation on the part of those in charge, with the constant aim of giving the student as complete and thorough a training in general, analytical and industrial chemistry as can be mastered in three years' time.

The fundamental object of the Lowell Textile School is such that the course necessarily specializes along the line of textile chemistry and textile coloring, and it will be observed that these branches are exhaustively studied, but at the same time the work is so arranged that the student may acquire a general knowledge of chemistry, both organic and inorganic, analytical chemistry, both qualitative and quantitative, and physical chemistry together with an especially thorough study of general industrial chemistry.

At the end of each year the arrangement of the course has been reviewed and such changes made as were considered advantageous. The necessity of a four year instead of a three year course becomes more apparent each year, and it is not improbable that such a change will become necessary before long.

CHEMISTRY LECTURE ROOM



## Object of Department

Previous to 1856 there were no artificial dyestuffs, and the dyer depended almost entirely upon the so-called dye-woods or natural coloring matters, and certain mineral pigments. At that time the whole art of dyeing was in the hands of a few men, who depended upon their secret books of receipts, which had in many cases been handed down to them through several generations and which they often held as sacred as their Bible. Now and then these books received such additions as their owners might have acquired from some of their more communicative fellow-craftsmen, or accidentally discovered while at their work. We say accidentally discovered, for at that time it was not customary for dyers to conduct any systematic examination of their processes, and in most cases they had no conception of the chemical reactions taking place. In other words, dyers depended entirely on the so-called "Rule of Thumb," and textile coloring at that time could scarcely have been said to possess even the first essentials of a science.

The discovery of mauve by Perkin in 1856 and magenta by Hoffman in 1858 gave some indication of the possibilities that lay dormant in coal tar, and many of the leading chemists turned their attention toward this heretofore valueless by-product of the coal gas industry. Extended investigations conducted along scientific lines resulted in the preparation of numerous artificial dyestuffs, and with the discovery of artificial alizarine in 1868, the art of textile coloring began to assume a new aspect. It required chemists to work out the most practical and economical methods of applying these new coloring matters; the dyer was obliged to depend upon the chemist for much of the information necessary to his trade, and his receipt book began to be replaced by the writings and records of the investigations of scientific men. In this manner the unclassified knowledge of the older dyers gradually developed into a science, and today the art of dyeing, together with the manufacture of the necessary dyestuffs, may be looked upon as one of the most important branches of industrial chemistry.

From these facts it is obvious that the modern textile colorist, in order to attain the highest efficiency in his work, must be



EXPERIMENTAL PRINTING LABORATORY

thoroughly grounded in chemistry, and the textile chemist, who is constantly called upon to solve some of the most complicated and perplexing of chemical problems, must be well trained as an analyst and familiar with the principles of chemical technology.

The superficial knowledge of chemistry received at the average academic school or college is by no means sufficient, and that of the general technical school not specific enough, to prepare the student for satisfactory work in the laboratory of the textile plant, or give him the knowledge or experience necessary to cope with the numerous chemical problems that are constantly arising in the bleachery, dyehouse and print works.

The object of the Chemistry and Dyeing Department is to give its students the following advantages:

1. A thorough education in general chemistry, both theoretical and descriptive, including organic as well as inorganic chemistry.
2. A careful training in the general principles of analytical chemistry, both qualitative and quantitative, and their application in technical analysis.
3. A study of the general principles of chemical technology with special attention to those branches of industrial chemistry as are allied in any way to the textile and color industries, together with a large amount of laboratory work relating to the manufacture of the compounds used by the textile colorist and the treatment of waste materials.
4. An exhaustive study of textile chemistry, dyeing and textile printing, with the performance of an extended course of experimental and practical work in the laboratory and dyehouse, the school furnishing excellent facilities for the carrying out, upon the commercial scale, of the process studied in the classroom and laboratory.
5. An opportunity to make a detailed study or investigation of some special subject as a thesis previous to graduation.

The course in Chemistry and Dyeing is especially recommended to those who intend to enter any branch of textile coloring, bleaching or the manufacture or sale of the various dyestuffs or chemicals used in the textile industry. The training is so general, however, that it serves as an excellent foundation for every branch of chemical work.



## SYNOPSIS OF CHEMISTRY AND DYEING COURSE

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During the first year General Chemistry, including both Inorganic and Organic, is taught by lectures and laboratory work, and this is supplemented during the second term by Qualitative Analysis and Stoichiometry. The lectures upon Textile Chemistry also begin during the first year.

Advanced Inorganic as well as Advanced Organic Chemistry are studied throughout the second year as a continuation of the Elementary Chemistry of the first year, but the majority of the time is spent upon Quantitative Analysis, Industrial Chemistry and Textile Chemistry and Dyeing.

The third year is devoted to Advanced Textile Chemistry and Dyeing, Dye Testing, Dye Matching, Woolen and Worsted Finishing, Calico Printing and Cotton Finishing, Quantitative Analysis, Industrial Chemistry, Physical Chemistry and Thesis work.

The work is taken up in a thorough manner and has been so arranged that the amount of time spent in the laboratories and in classroom work balance each other. Sufficient studies are taken in the other departments to broaden the knowledge of the student in regard to textile work in general, and he is given such training as the time will permit in mathematics, mechanics, mechanical drawing, modern languages and designing.

The student who conscientiously performs all of the prescribed laboratory work and the practice work should be proficient not only in dyeing and textile printing, but should be well trained in the methods of analysis and the testing of the various chemicals, mordants and dyestuffs so extensively used in the textile industry.

Students who have taken a thorough course in Chemistry in some technical school or college may, after satisfying those in charge of their proficiency to take advanced work, be admitted to the second year class, but in no case can any student, who has not previously made a special study of Textile Chemistry and Dyeing, complete the course in less than two years.

For detail description of subjects see pages 15 to 34.



# FIRST YEAR

## FIRST TERM

(Common to all courses)

	Hours of Exercise		Hours of Exercise
General Chemistry .....	187	Hand Looms .....	55
Elements of Mechanism .....	60	Freehand Drawing .....	15
Mechanical Drawing .....	97	Decorative Art .....	15
Mathematics .....	30	German .....	20
English .....	30		

## SECOND TERM

Elementary Organic Chemistry	30	Cloth Analysis .....	30
Textile Chemistry .....	15	Elements of Mechanism .....	60
Stoichiometry .....	30	Mathematics .....	30
Qualitative Analysis .....	195	Mechanical Drawing .....	38
German .....			20

## OPTIONS :

Free Hand Drawing

Decorative Art

# SECOND YEAR

## FIRST TERM

Advanced Organic Chemistry	15	Dyeing Laboratory .....	150
Advanced Inorganic Chemistry	30	Mechanics .....	30
Industrial Chemistry .....	120	Quantitative Analysis .....	112
Textile Chemistry and Dyeing	30	Power Loom Weaving .....	30

## SECOND TERM

Advanced Organic Chemistry.	30	Quantitative Analysis .....	150
Advanced Inorganic Chemistry	30	Mechanics .....	30
Textile Chemistry and Dyeing	30	Electricity .....	30
Dyeing Laboratory .....	120		

## OPTIONS :

Designing

Advanced Mathematics

Power Loom Weaving

# THIRD YEAR

## FIRST TERM

Industrial Chemistry .....	68	Physical Chemistry .....	30
Advanced Textile Chemistry		Quantitative Analysis .....	135
and Dyeing .....	30	Electricity .....	10
Dyeing Laboratory .....	157	Finishing .....	45

## SECOND TERM

Industrial Chemistry .....	30	Quantitative Analysis .....	98
Physical Chemistry .....	20	Woolen and Worsted Finish-	
Advanced Textile Chemistry		ing .....	45
and Dyeing .....	20	Calico Printing and Cotton	
Dye Testing and Color Match-		Finishing .....	60
ing .....	80	Thesis .....	150



EXPERIMENTAL DYEING LABORATORY

## Requirements for Admission

Candidates for admission will be accepted upon presentation of properly vouched certificate showing the completion of a regular four year High School course. All others will be required to pass entrance examinations in arithmetic, English, geography, algebra and geometry which will be held in June and September of each year. For further details in regard to entrance examinations see general bulletin of the school.

## Tuition Fees and Laboratory Deposits

The tuition fee for the regular day course is \$100 per year for residents of Massachusetts and \$150 per year for non-residents. Students provide their own books, stationery, tools, etc.

Every student taking the regular Chemistry and Dyeing course must make a laboratory deposit of \$15 at the beginning of each term before he will be allowed to work in the laboratories. At the end of each year any unexpended balance will be returned, or in case the deposit has been overdrawn, a bill will be sent to the student.

## Special Scholarship Prizes

Through the interest of a friend of the School, the following special scholarship prizes have been offered. They are of such a character as to prove of special interest to the student in the Chemistry and Dyeing course.

First:—Ten dollars to the regular student in either the Second or Third Year class who shall write the best article upon one of five specified subjects to be selected by the Faculty.

Second:—Ten dollars to the student taking any regular course in the school, who shall be considered as having attained the highest scholarship in First Year Chemistry.

Third:—Ten dollars to the student taking any regular course, other than the Chemistry and Dyeing course, who shall be considered as having attained the highest scholarship in the Second Year Textile Chemistry and Dyeing.

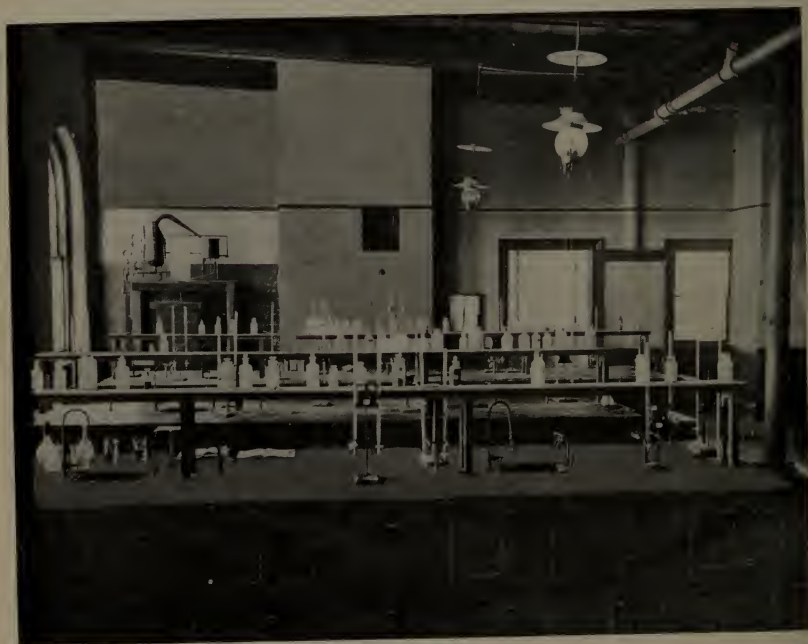
Fourth:—Ten dollars to the regular student of the Chemistry and Dyeing course who shall be considered as having obtained the highest scholarship during his Second Year.

Fifth:—Twenty dollars to the regular student in the Chemistry and Dyeing course who shall present the best Thesis at his graduation.

The above sums to be invested in books and the awards to be made each June by such persons as the faculty of the school shall designate.



GENERAL CHEMISTRY LABORATORY



QUANTITATIVE LABORATORY

In case no one is considered as being worthy of any particular scholarship, the same may be withheld and added proportionately to the scholarships awarded.

These awards to be first made in June, 1906, and to continue indefinitely.

### Library

In addition to the regular School library, which is supplied with the leading textile books and papers, a special departmental library of the latest books and journals upon chemical and dyeing subjects has been made possible through one interested in this department.

## SPECIAL DESCRIPTION OF THE SUBJECTS TAUGHT IN THE CHEMISTRY AND DYEING DEPARTMENT

### Elementary Chemistry

This subject is required not only of the students taking the regular course in Chemistry and Dyeing, but by all others intending to take a complete course and receive the school diploma.

It will include lectures, recitations, and a large amount of individual laboratory work upon the following subjects, and will extend through one entire year:—

#### *Chemical Philosophy.*

Chemical action, chemical combination, combining weights, atomic weights, chemical equations, acids, bases, salts, Avogadro's law, molecular weights, formulas, valence, periodic law, etc.

#### *Non-Metallic Elements.*

Study of their occurrence, properties, preparation, chemical compounds, etc.

#### *Metallic Elements.*

Study of their occurrence, properties, metallurgy, chemical compounds, etc.

#### *The Hydrocarbons and their Derivatives.*

Study of their occurrence, properties, preparation, uses, etc. This work although elementary in character is of sufficient breadth to prepare the student understandingly for the work with the artificial dyestuffs which follows.





BALANCE ROOM



INSTRUCTORS PRIVATE LABORATORY



### *Qualitative Analysis.*

Before the completion of the course, the student will take up as thoroughly as the time will permit, the qualitative detection of the more common metals and non-metals, with practical work.

### **Qualitative Analysis**

Qualitative Analysis will be studied by all regular students of the Chemistry and Dyeing course during the second term of the first year. The work will be based upon Prescott and Johnson's Qualitative Chemical Analysis and will consist of one lecture, one recitation, and not less than twelve hours laboratory work per week. The student must become familiar with the separations and the detections of the common metals and acids by the analysis of a satisfactory number of solutions, salts, alloys, pigments, etc. At intervals during the term, short laboratory tests will be given as well as the regular written examinations.

No pains will be spared to make the course as valuable to the student as possible and to encourage only thorough and intelligent work.

When sufficiently advanced, students will take up the examination of various products with which the textile chemist must be familiar, such as testing mordanted cloths, pigments, and the various dyeing reagents.

During the latter part of this course a certain amount of time will be devoted to the preliminary operations of Quantitative Analysis, such as the precipitation and washing of such substances as barium sulphate, magnesium ammonium phosphate, calcium oxalate, etc., although no weighings or actual determinations will be made.

A student's marks in this subject will depend as much upon the neatness and care used in manipulation as upon the actual results obtained.

### **Stoichiometry**

This subject will be taken up by Chemistry and Dyeing students during the second half of the first year.

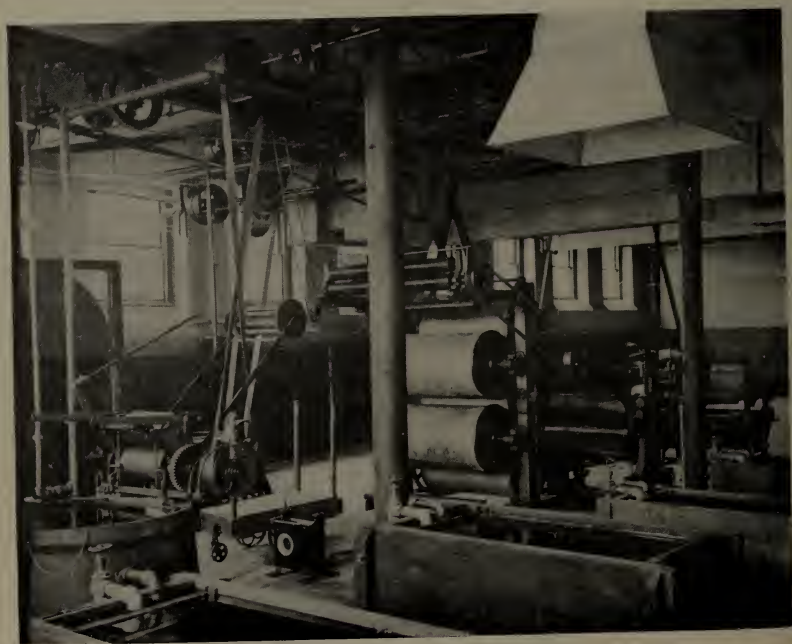
The application of the metric system will be thoroughly studied and problems will be worked involving the expansion and contraction of gases, determination of empirical formulae, combining volume of gases, quantitative analysis, etc.

### **Advanced Inorganic Chemistry**

The whole subject of Inorganic Chemistry will be reviewed during the second year, and many advanced topics introduced which were necessarily omitted from the first year course in General Chemistry.



VIEWS IN COMMERCIAL DYEING LABORATORY



## Advanced Organic Chemistry

This course will consist of lectures and recitations extending through the second year. The principles of organic substitution and synthesis will be thoroughly discussed using as many illustrations as the time will permit, particularly such as are applied in the arts. The alliphatic series of hydrocarbons and their derivatives will be studied for about twenty weeks of the year, the remainder of the time being devoted to the benzene series. The aim of the course is to lay a broad foundation for the chemistry of the artificial dyestuffs, which is studied in the third year. Students are required to work out problems in the synthesis of various compounds in order to get familiarized with equation writing.

## Physical Chemistry

This subject will be studied during the third year.

It will include the principles of calorimetry, specific heat, vapor density, the various methods of determining molecular weights, laws of solution, electrolytic dissociation, theories of precipitation, thermo-chemistry, surface tension, etc. The student will be required to work out a large number of problems introduced by the subject.

## Quantitative Analysis

This subject will be taken up by all regular Chemistry and Dyeing students, and extends through the second and third years of the course.

During the second year, the principles of analytical work are thoroughly taught, the work being based on Talbot's Quantitative Chemical Analysis. Gravimetric analysis is studied during the first term, and volumetric analysis during the second term. The samples analyzed include salts, ores, minerals, bleaching powder, and alkalis. Frequent recitations are held for the discussion of methods and the solution of stoichiometrical problems. Students are encouraged to read the standard works and magazines on chemical subjects in order to cultivate broad views of the science.

The third year work involves chiefly technical analyses, the principal consideration being the analysis of water, alum, ammonia, soaps, coal, indigo, tannin, and the ultimate analysis of organic compounds, as well as the examination of acids, alkalis, oils, scouring materials, and such substances as starches, gums, and other thickeners, detection of adulterants, etc., etc.

No pains will be spared to give the students the benefits of all the latest researches along the lines of industrial analytical methods, and the students will be encouraged to do original work.



VIEWS IN COMMERCIAL DYEING LABORATORY



## TEXTILE CHEMISTRY AND DYEING

Under this head is included first, the lecture course in Textile Chemistry and Dyeing, which is taken by all regular diploma students; second, the general laboratory course taken by all regular diploma students, except those taking the regular Chemistry and Dyeing course, and the laboratory and practical work course which will be taken by the regular Chemistry and Dyeing students.

### Outline of Lecture Course

#### *Technology of Vegetable Fibers.*

Cotton, Linen, Jute, Hemp, China Grass, etc. Chemical and physical properties, chemical composition, microscopical study and their action with chemicals, acids, alkalis, heat, etc.

#### *Technology of Animal Fibers.*

Wool, Mohair, Silk, etc. Chemical and physical properties, chemical composition, microscopical study and their action with chemicals, acids, alkalis, heat, etc.

#### *Technology of Artificial Fibers.*

Study of the various forms of artificial silk, the process of manufacture, their properties and action with chemicals, acids, heat, etc.

#### *Operations Preliminary to Dyeing.*

Bleaching of cotton and linen, wool scouring, bleaching, fulling and felting of wool, carbonizing, silk scouring and bleaching, action of soap.

The bleaching of cotton cloth, yarn and raw stock is studied at length with detailed descriptions of the various forms of kiers and machinery used; also the action of the chemicals used upon the material and the various precautions that must be taken in order to insure successful work.

Under this heading is also included an exhaustive study of the reagents used in the emulsive wool scouring process and their action upon the fiber under various conditions; also the most successful of the solvent methods for degreasing wool.

#### *Water and its Application in the Textile Industry.*

Impurities present, methods of their detection, their effect during the different operations of bleaching, scouring, dyeing and printing, and the methods for their removal or correction.





VIEW IN COMMERCIAL DYEING LABORATORY



The important subject of boiler waters is also studied under this heading with a full discussion of the formation of boiler scale, its disastrous results and the methods by which it may be prevented.

*Mordants and Other Chemical Compounds used in Textile Coloring not Classified as Dyestuffs.*

Theory of mordants, their chemical properties and their application, aluminium mordants, iron mordants, tin mordants, chromium mordants, organic mordants, tannin materials, soluble oil, fixing agents, levelling agents, assistants, and numerous other compounds not dyestuffs that are extensively used in the textile industry.

Under this heading is included the definitions of various terms and classes of compounds used by textile colorists, such as color lakes, pigments, fixing agents, developing agents, mordanting assistants, mordanting principles, levelling agents, etc.

*Theory of Dyeing.*

A discussion of the chemical, mechanical, solution and absorption theories, and the various views that have been advanced by different investigators of the chemistry and physics of textile coloring processes.

Under this heading is discussed the general methods of classifying dyestuffs and definitions of such terms as textile coloring, dyeing, textile printing, substantive and adjective dyestuffs, monogenetic and polygenetic dyestuffs, etc.

*Natural Coloring Matters.*

Organic, properties, and application of indigo, logwood, catechu or cutch, Brazil wood, cochineal, fustic, tumeric, madder, quercitron bark, Persian berries, and other natural dyestuffs that have been used within recent years by textile colorists.

*Mineral Coloring Matters.*

Under this heading is discussed the properties of such inorganic coloring matters and pigments as chrome yellow, orange and green, Prussian blue, manganese brown, iron buff, etc.

*Artificial Coloring Matters.*

General discussion of their history, nature, source, methods of manufacture, methods of classification, and their application to all fibers  
Special study of:—

Basic Coloring Matters.

Phthalic Anhydride Colors, including the eosins, phloxines, etc.



VIEWS IN PROFESSOR'S PRIVATE LABORATORY



Acid Dyestuffs.

Janus Colors.

Direct Cotton Colors.

Sulphur Colors.

Mordant Colors, including the alizarines and other artificial coloring matters requiring metallic mordants.

Mordant Acid-Colors.

Insoluble Azo Colors, developed on the fiber.

Reduction Vat Colors, including Artificial Indigo, Indanthrene, Flavanthrene, Viridanthrene and Melanthrene.

Aniline Black and other artificial dyestuffs not coming under the above heads.

As each class of dyestuffs is taken up, the detail of the methods of applying them upon all the different classes of fabrics and in all the different forms of dyeing machines are thoroughly discussed; also the difficulties which may arise in their application, and the methods adopted for overcoming them.

### *Machinery used in Dyeing.*

A certain amount of time will be devoted to the description of the machinery used in the various processes of textile coloring, which will be supplemented as far as possible by the use of charts, diagrams, lantern slides, etc.

Most of the important types of dyeing machines are installed within the dyehouse of the School and the students can be taken directly from the lecture room and shown the machines in actual operation.

### **Outline of Laboratory and Practical Work**

Besides lectures and recitations upon this subject, those taking the regular day course in Chemistry and Dyeing will be required to do at least fifteen hours per week of practical laboratory work. By the performance of careful and systematic experiments the student will learn the nature of the various dyestuffs and mordants, their coloring properties, their action under various circumstances and the conditions under which they give the best results. The more representative dyestuffs of each class will be applied to cotton, wool and silk, and each student will be obliged to enter in an especially arranged sample book, a specimen of each of his dye trials with full particulars as to the conditions of experiment, percentage of compounds used, time, temperature of dye bath, etc.

For convenience and economy most of the dye trials will be made upon small skeins or swatches of the required material, but from time to time students will be required to dye larger quantities, in the full sized dyeing machines which are described elsewhere.



VIEW IN EXPERIMENTAL DYEING LABORATORY



VIEW IN INDUSTRIAL CHEMISTRY LABORATORY

By the use of a small printing machine the principles of calico printing are illustrated, and with the introduction of dyeing machines, vats, etc., the practical side of the subject will be studied, and it will be the constant endeavor of those in charge, to impart such information of a theoretical and scientific character as will be of value in the operation of a dyehouse.

### **Advanced Textile Chemistry and Dyeing**

This is a continuation of the Textile Chemistry and Dyeing of the second year and includes a review of the second year's work in this subject, with the introduction of many advanced considerations, and in addition, the following subjects:—

#### *Classification and Constitution of Artificial Dyestuffs.*

A study from a more advanced standpoint of the classification and constitution of the artificial dyestuffs, including the various methods used in their production, also the orientation of the various groups which are characteristic of these compounds, and their effect on the tinctorial power of dyestuffs.

The object of this study is to give the student a more complete knowledge of the artificial dyestuffs from the color manufacturer's point of view, and it will prove of particular value to those who intend later to enter the employ of dyestuff manufacturers or dealers.

This subject cannot be taken by students who have not completed the second year course in Organic Chemistry.

#### *Color Matching and Color Combining.*

A study of that portion of physics which deals with color, and of the many color phenomena of interest to the textile colorist, the lecture work being supplemented with the practical application of the spectroscope and tintometer, and much practice in the matching of dyed samples of textile material.

The primary colors both of the scientist and textile colorist and the results of combining colored lights and colored pigments, and such subjects as color perception, color contrast, purity of color, luminosity, hue, color blindness, dichroism, fluorescence, and the effect of different kinds of light upon dyed fabrics are discussed under this heading.

Each student's eyes will be tested for color blindness early in the course in order that he may be given an opportunity to change his course if his eyes should prove defective enough to interfere with his work as a textile colorist.

A dark room has been provided where various experiments in color work and color matching may be performed.





VIEWS IN INDUSTRIAL CHEMISTRY LABORATORY





### *Dye Testing.*

This subject includes the testing of several dyestuffs of each class, to all the common color destroying agencies, the determination of their characteristic properties and their action towards the different fibers. Also the determination of the actual money value and coloring power of dyestuffs in terms of a known standard.

Each student is required to make a record of each color tested upon an especially prepared card which furnishes a permanent record of the dyestuff, its dyeing properties, fastness to light and weather, washing, soaping, fulling, perspiration, bleaching, steaming, ironing, rubbing, acids and alkalis.

### *Union Dyeing.*

A study of the principles involved in the dyeing of cotton and wool, cotton and silk, and silk and wool union materials with the production of solid and two colored effects.

### *Textile Printing.*

A thorough study of the whole subject of textile printing, each student being required to individually produce no less than twenty different prints including the following styles:— Pigment style, direct printing style, steam style with tannin mordant, steam style with metallic mordant, madder or dyed style, the ingrain or developed azo style, discharge dyed style, discharge mordanted style, resist style, indigo printing, aniline black printing.

The different parts of the calico printing machine are thoroughly studied, the precautions which must be considered in its use and the arrangement of the drying apparatus which must accompany such a machine.

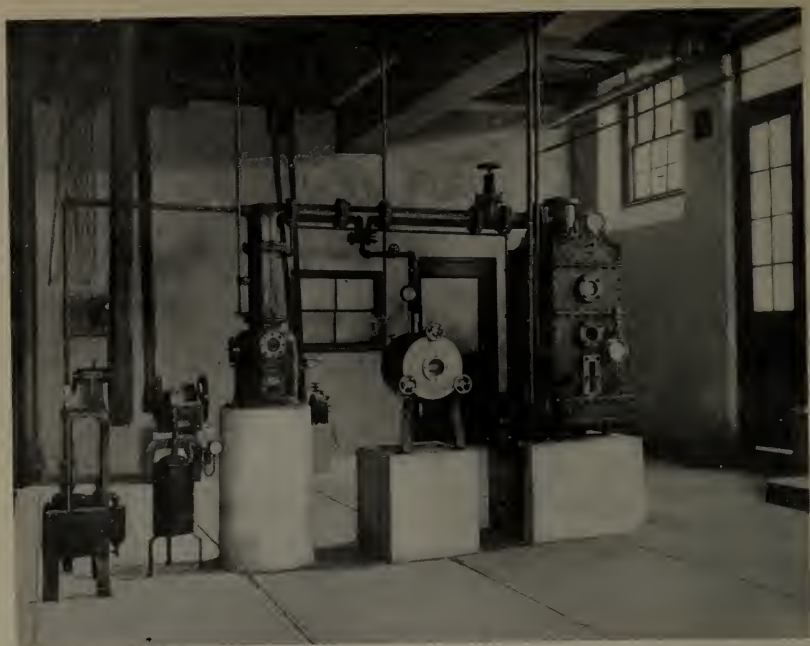
Special attention is paid to the methods of mixing and preparing the various color printing pastes that are used in the above work upon the manufacturing scale as well as experimentally in the laboratory.

### *Cotton Finishing.*

A study of the various processes of finishing cotton cloth, and the different materials used therein. The work involves the discussion of the various objects of cotton finishing and such operations as pasting, damping, calendering, stretching, stiffening and filling, and the various machines used for carrying out these processes.

### *Mill Visits.*

During the third year, visits will be made to some of the large dye-houses, bleacheries and printworks in the vicinity.



VIEWS IN INDUSTRIAL CHEMISTRY LABORATORY



## Industrial Chemistry

Special attention has been given to this subject, because it is considered extremely important in the study of chemistry in general, and of textile chemistry in particular. During the second year considerable time is spent in the laboratory in the actual manufacture, from raw materials, of the chemical compounds used in textile work. Each student is required to make careful record of all of the crude materials used, as starting points, and to carry the various processes through as carefully as possible with the view of producing as great and pure a yield of each substance as possible. Industrial Chemistry not only involves the application of the principles of both inorganic and organic chemistry, but of analytical work as well, for the purity of the compounds produced must be tested after their manufacture.

In addition to the general work in this subject, each student is required to make a special study of the manufacture of some chemical from raw materials in considerable quantity (20 to 25 pounds) making a complete quantitative analysis of all the raw materials used and of the finished product, accounting for everything throughout the process with the object of producing as near the theoretical yield as possible. The student is charged with the amount of raw materials at market prices, and the finished product is bought back by the school.

During the past year extensive construction work and much new apparatus has been added to the industrial chemistry laboratory (see page 37) and it is now believed to be one of the most complete of its kind. The present equipment allows of a comparatively large quantity of materials being handled at one time.

During the whole of the third year, lectures and recitations are held in Industrial Chemistry, the course in general following "Thorpe's Outline of Industrial Chemistry." Particular attention is paid to those subjects which are of especial interest to the textile chemist, as oils, soaps, gas and coal tar industry, building materials and the manufacture on a large scale of important chemical compounds, such as the common acids and alkalies, bleaching powder, various mordants, etc. The course will be illustrated as far as possible with specimens, diagrams and charts, and the students will be given an opportunity to visit some of the industrial establishments in the vicinity of Lowell and Boston.

## Microscopy

The value of the microscope in the detection and examination of the various fibres cannot be over-estimated, and often facts may be discovered, and conclusions drawn, which could be arrived at in no other way.

The students in this course will be given as much work with the microscope as time will permit. They will receive instruction in the use



CORNER OF CHEMICAL MUSEUM

of high grade microscopes, and will not only have practice in the examination and detection of the fibres, but will be required to become proficient in the preparation of permanent slides.

Opportunity is also given for students to take microphotographs of fibers and the various slides which they may prepare. A special dark room has been provided for this purpose.

### **Thesis**

Before graduation the student must present a thesis which shall consist of a report of some original investigation or research that he has conducted while at the school.

A certain number of hours are specially set aside for this work during the third year and students are encouraged to select some subject for their investigation which shall be of practical as well as theoretical interest. This must be completed and approved by the head of the department before the annual examination in May.

During 1906-1907 theses have been written upon the following subjects:

The Effect of Potassium Bichromate on Mordant Acid Colors as Regards their Fastness to Light.

The Tendering of Cotton Fibers Dyed with Sulphur Blacks: Its Cause and Prevention.

The Effect of the Permanent Hardness of Water upon the Application of the Artificial Dyestuffs.

The Study of Wool with the Ultimate Object of Determining its Comparative Action towards Sodium and Potassium Compounds.

The Comparative Values of Indigo, Sulphur and Indanthrene Blues.

The Aldehyde Derivatives of the Hydrosulphites and their Uses as Discharging and Stripping Agents.

The photo-micrographic Study of the Fibers.

Comparison of the Various Antimony Compounds used as Fixing Agents for Tannic Acids.

The Mordanting of Wool with Potassium Bichromate.

The Chemical Retting of Flax.

### **Work Taken in other Departments by the Chemistry and Dyeing Students**

The work taken by the students of the regular Chemistry and Dyeing course in other departments has been selected only after much thought and study upon the part of those in charge, and it is intended to give the student such knowledge and experience outside of his own specialty as will be of the greatest value to him.



The textile colorist and chemist of today must be more or less of a chemical engineer, and to the man who is to be placed in charge of such complicated machinery as now constitutes the equipment of every large dyehouse and print works, a knowledge of the elements of mechanism and a conception of mechanical drawing is indispensable.

A thorough knowledge of arithmetic and algebra is absolutely necessary to the chemical student and he need have no fear that he is wasting time even upon the study of higher mathematics.

Sufficient work is taken in the Designing Department to give the student a knowledge of the different varieties of cloth, their structure and the adaptation of various designs to the loom. A certain amount of time is devoted to both hand loom and power loom work.

Work in the woolen and worsted Finishing is very closely allied to that of the commercial dyeing, and a special course in this work is given to all regular Chemistry and Dyeing students by the Head Instructor of the Woolen and Worsted Finishing Department during the third year. It includes a study of the methods of examining cloth as it comes from the loom, the fulling process, flocking and its purpose, the use of soaping and washing machines, napping machines, gigs, crabbing machines, tentering machines, shearing machines, brushing machines, and the methods of measuring, weighing, ticketing, numbering, rolling, baling, casing, and shipping finished woolen and worsted cloth.

### **Working Rooms and Equipment of the Chemistry and Dyeing Department**

#### *The Chemical Lecture Room.*

Is provided with a lecture table fully equipped with gas, water, sinks, a hood and sufficient apparatus for lecture experiments.

An electric arc reflectoscope provided with suitable screen, thus making it possible to illustrate a lecture either from slides or by cuts, photographs and objects.

Seats are provided for 80 students, being arranged on a raised floor so that every student has a full view of the lecture table.

#### *Chemical Museum.*

This room adjoins the Chemical Lecture Room and contains various collections of dyestuffs, dyed samples, chemicals and minerals for exhibition and lecture demonstration.

#### *Chemical Recitation Room.*

Fitted with lecture tablet armchairs and blackboards.



*General Chemistry and Qualitative Laboratory.*

One hundred and twenty laboratory desks, each containing a full set of apparatus for the first year's work in chemistry; also gas and water fittings, reagent bottles and sinks.

Four Large Double Hoods.

Two Steam Baths.

One Parson's Automatic Gas Generator.

*Quantitative Laboratory.*

One Water Distilling Apparatus.

One Steam Drying Closet and Several Drying Ovens.

One Large Steam Bath.

One Electrolytic Table.

Five Hoods.

Twenty-six laboratory desks, each fully provided with gas, water, suction, sinks, etc.

*Balance Room.*

One Large Christian Becker Analytical Balance.

Three Small Christian Becker Analytical Balances.

One Staudinger Analytical Balance.

One Eimer and Amend Analytical Balance.

One H. L. Becker's Son and Co. Analytical Balance.

*Combustion Room.*

One Combustion Furnace, 25 burners.

One Lothar Meyer's Furnace for tubes.

One Kerosene Burner Muffle Furnace.

*Microscopic and Colorimetric Laboratory.*

Two Benches for microscopical work.

Three Bausch and Lomb Compound Microscopes.

One Nacet et Fils Compound Microscope.

Desk and shelves for the apparatus and reagents necessary for this branch of the work.

One Tintometer.

*Dark Room.*

This room is equipped with apparatus for Spectrum Analysis, Photometric Work, Photomicrography, and various forms of Artificial Light for color matching.

### *Office and Library.*

Adjoining rooms equipped with desks, filing cases and bookcases in which the administrative records and chemical library are kept.

### *The Professor's Private Laboratory.*

One Christian Becker Balance.  
One Large B. & L. Microscope.  
One Parr Calorimeter.  
One Case for Chemicals and Apparatus.  
Three Laboratory Benches, with necessary fittings.  
One Large Hood.  
One Steam Bath.  
One Experimental Dyeing Apparatus.  
One Porcelain Sink and Drain Board.  
Complete Equipment of Chemical Apparatus for Research Work.

### *Stock Room.*

This room adjoins the office, and in it is kept an extensive stock of chemicals and apparatus.

### *Private Laboratory of Chemistry Instructors.*

One Large Case for Chemicals.  
One Double Hood.  
One Copper Water Bath.  
One Soapstone Sink with a Drain Board.  
Benches, desks and complete fittings for water, gas and suction.

### *Experimental Dyeing Laboratory.*

The dyeing laboratory is equipped with individual benches, small dyeing apparatus, reels, balances, apparatus for dye testing, such as frames for exposing dyed material to light, etc.  
One Small Hydro-Extractor, from W. H. Tolhurst and Sons, Troy, New York.  
Twenty-four Steam Jacketed Experimental Dyeing Machines.  
One Drying Chamber.  
One Ageing Chamber.

### *Experimental Printing Laboratory.*

One Calico Printing Machine, made by Mather and Platt, Oldham, England.  
One Iron Jacketed Steaming Chamber, from A. Edmeston and Son, Salford, England.  
One set of Steam Jacketed Copper Kettles.

*Private Laboratory of Instructors in Textile Coloring.*

This room adjoins the Experimental Dyeing and Printing Laboratories, and contains the records of work in this department, and a collection of dyestuff samples, sample cards, etc.

*Industrial Chemistry Laboratory.*

- One Filter Press, Type E, T. Shriver and Co.
- One Single Acting Triplex Plunger Pump, Gould's Mfg. Co.
- One Vacuum Drying Apparatus, Norman Hubbard's Sons.
- One Surface Condenser, Norman Hubbard's Sons.
- One Packard Vacuum Pump, Norman Hubbard's Sons.
- One Vacuum Evaporator, Swenson System, American Foundry and Machine Co.
- One Centrifugal, C. H. Chavant and Co.
- One Double Jar Mill, F. I. Stokes and Co.
- One Sturtevant Ore Crusher.
- One Sturtevant Pulverizer.
- Ten Copper Steam Baths, D. H. Wilson and Co.
- One General Electric Company  $5\frac{1}{2}$  H. P. Motor.
- One 36 in. Ventilating Fan, Mass. Fan Co.
- One Autoclave.
- Twenty-four Lockers.
- Two Concrete Top Tables.

*Commercial Dyeing Laboratory.*

- One Kier, Atlantic Works, East Boston, Mass.
- One 4 String Dyeing Machine, Rodney Hunt Machine Co., Orange, Mass.
- One Mercerizing Machine.
- One Raw Stock Dyeing Machine, Klauder-Weldon Dyeing Machine Co., Amsterdam, N. Y.
- One Yarn Dyeing Machine, Klauder-Weldon Dyeing Machine Co., Amsterdam, N. Y.
- One Jig Dyeing Machine, The Textile-Finishing Machinery Co., Providence, R. I.
- One Set of Drying Cans, The Textile-Finishing Machinery Co., Providence, R. I.
- One Chain Dyeing Machine, T. C. Entwistle Co., Lowell, Mass.
- One Raw Stock Drying Table, Philadelphia Textile Machinery Co., Philadelphia, Pa.
- One Padding Machine, Arlington Machine Works, Arlington, Mass.
- One Hydro-Extractor.
- Seven Dye Tubs.
- One Power Yarn Reel.

One Reeves' Variable Speed Device.  
Two Trucks.

For list of equipment of other Departments see General School Bulletins.

### Evening Classes

The work of the evening school in the Chemistry and Dyeing Department of the Lowell Textile School extends through four years of 20 weeks each and is arranged in three Courses which are designated as A, B and C.

#### *First Year*

The first year's work, which is the same for all three courses, consists of lectures Tuesday nights at 7.30 o'clock and Laboratory work Thursday nights at 7.00 o'clock upon the subject of Elementary Chemistry, Newell's Descriptive Chemistry being used as the reference text book. It is so arranged that upon Monday nights, first year students are at liberty to come to the school for explanations and further instructions upon the subjects taken up during the lectures.

#### *Second Year.*

Lectures for all three courses Monday nights at 7.30 o'clock upon Textile Chemistry and Dyeing, and Organic Chemistry, the Organic Chemistry being given every other Monday night.

<i>Course A.</i>	<i>Course B.</i>	<i>Course C.</i>
Laboratory Work	Laboratory Work	Laboratory Work
Experimental Dyeing	Qualitative Analysis	Same as Course B.

The laboratory work is arranged to accompany the Monday night lectures, and will be regularly held Friday evening at 7 o'clock.

#### *Third Year.*

Lectures every other Thursday night upon Dyeing and Organic Chemistry for all three courses.

<i>Course A.</i>	<i>Course B.</i>	<i>Course C.</i>
Laboratory Work	Same as Course A.	Laboratory Work
Dyeing Laboratory	Dyeing Laboratory	Quantitative Analysis

Laboratory work for Courses A and B, Monday and Friday evenings, and Thursday evenings when there is no lecture. Course C, Tuesday and Friday evenings, and Thursday evenings when there is no lecture.

*Fourth Year.*

Lecture every other Thursday night in Textile Coloring.

*Course A.*

Laboratory Work  
Dyeing Laboratory

*Course B.*

Same as Course A.  
Dyeing Laboratory

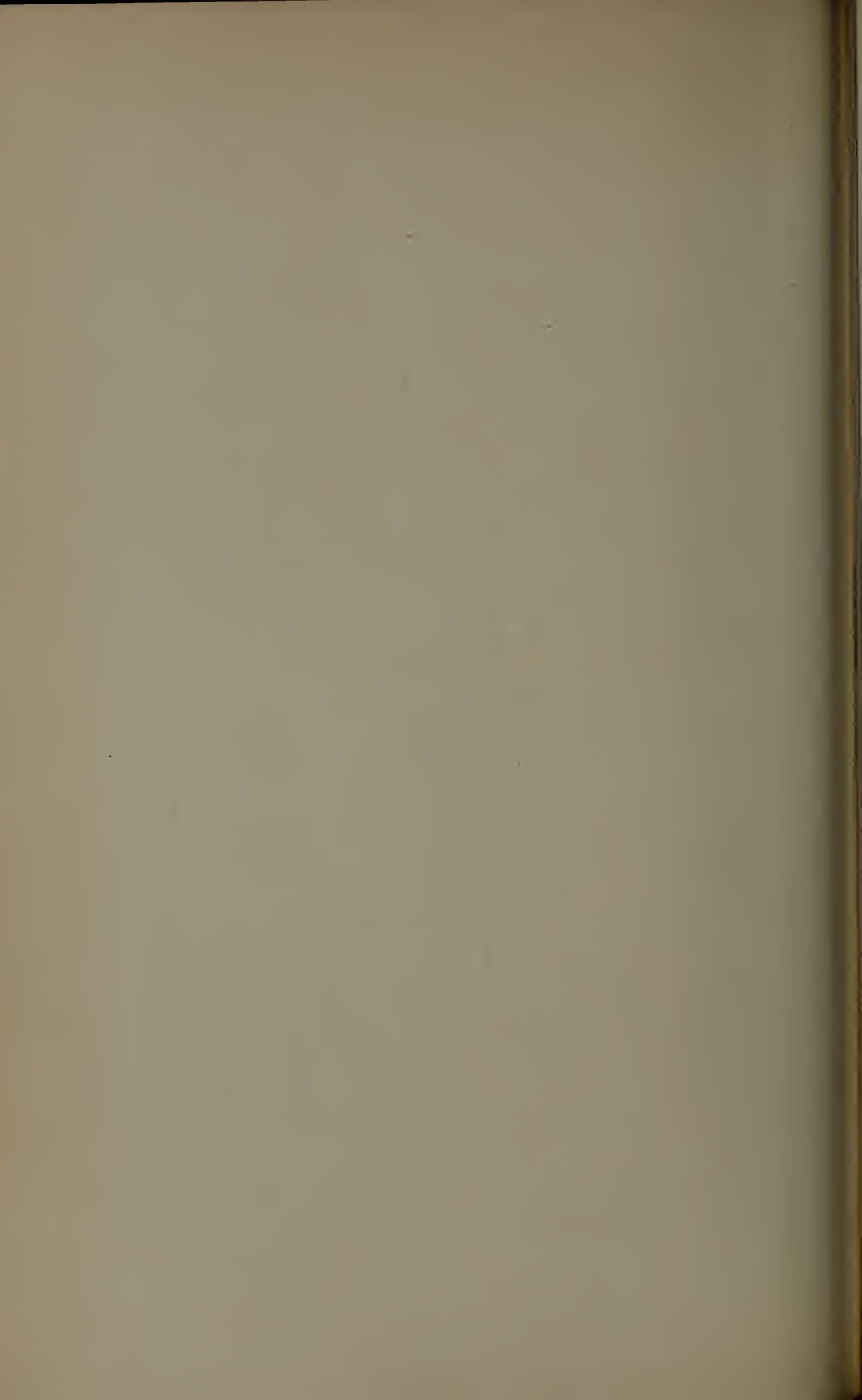
*Course C.*

Laboratory Work  
Quantitative Analysis

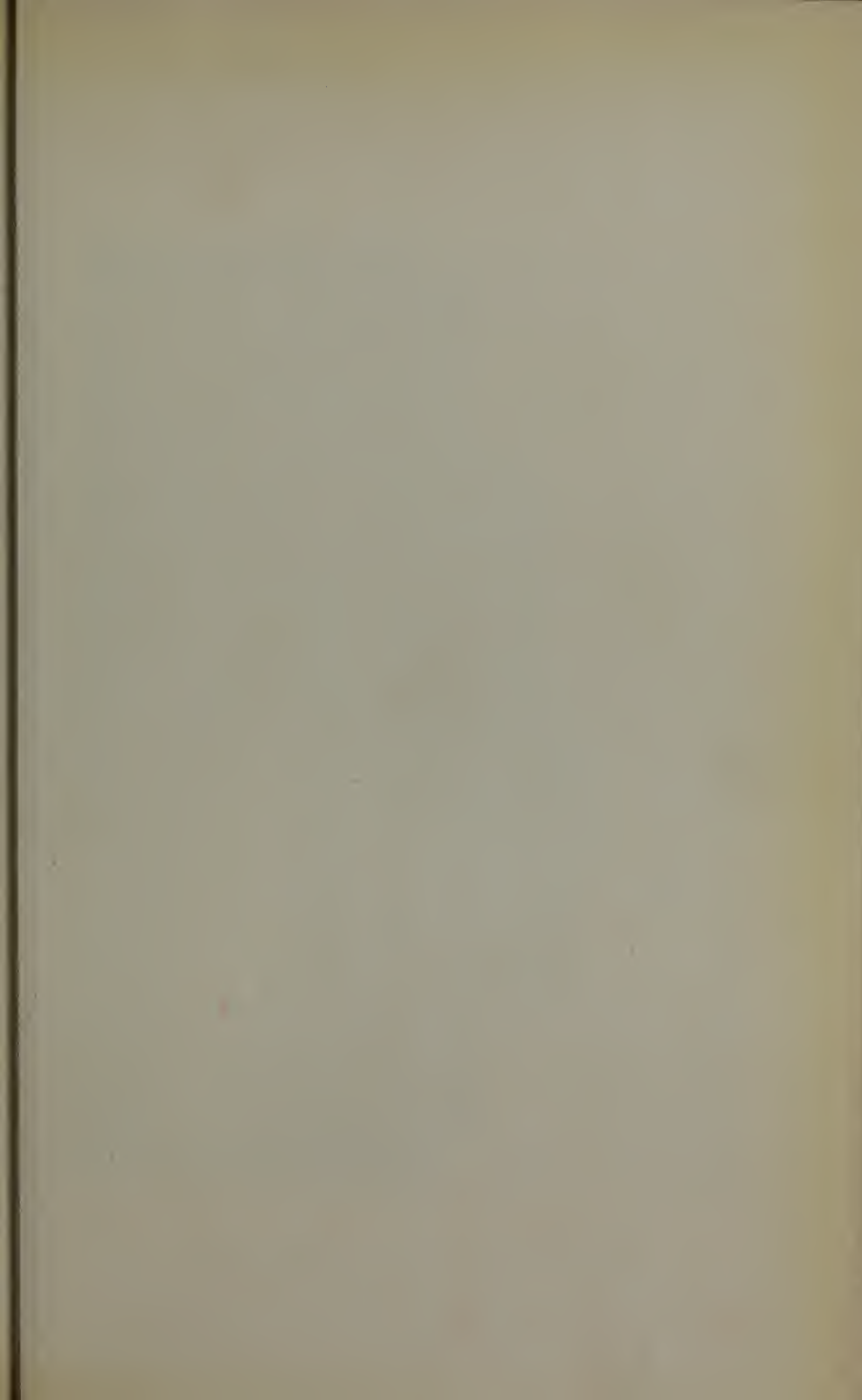
Regular Laboratory work Tuesday and Friday evenings, and Thursday evening when there is no lecture.

From the above schedules it will be noted that Course A specializes upon Textile Coloring, while Course C specializes upon analytical work. Course B is intermediate between the two and gives the best all round course in Chemistry and Dyeing.











FALMOUTH STREET BUILDING

SOUTHWICK HALL

BULLETIN

OF THE

Lowell Textile School

LOWELL, MASS.

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*Issued Quarterly*

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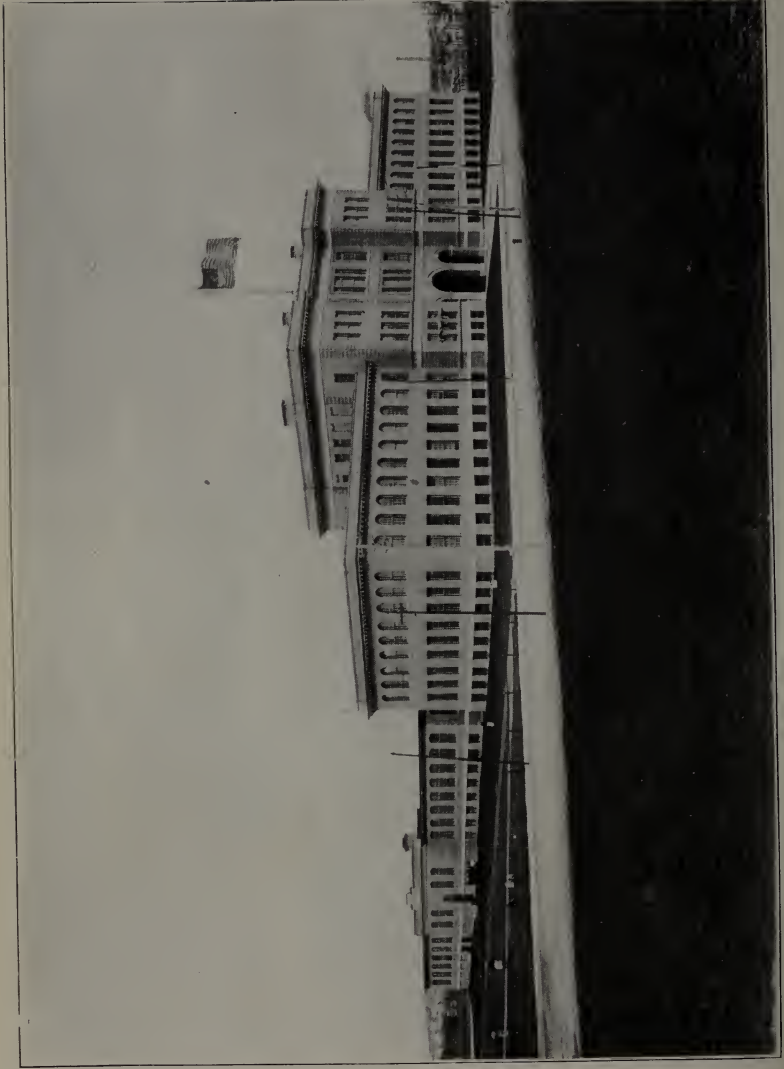
1907 - 1908

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Entered August 26, 1902, at Lowell, Mass., as second class matter,  
under Act of Congress of July 16, 1894.

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*Moody Street and Colonial Avenue*



KITSON HALL AND CAMPUS

SOUTHWICK HALL

## ADDENDA

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At the June meeting of the Board of Trustees, CHARLES L. HILDRETH retired as Permanent Trustee, elected as Honorary Trustee.

Trustee JACOB ROGERS elected Vice-President, vice ALPHONSO S. COVEL, deceased.

Trustee elected by Alumni, four years from July 1, 1907, T. ELLIS RAMSDELL, Class 1902, Agent Monument Mills, Housatonic, Mass.





# Trustees of the Lowell Textile School

(Incorporated 1895)

## Honorary Trustee

FREDERICK FANNING AYER

New York City

## The Corporation

### Officers, 1907

A. G. CUMNOCK, PRESIDENT  
VICE-PRESIDENT

JAMES T. SMITH, CLERK  
A. G. POLLARD, TREASURER

### Trustees

On the part of the Commonwealth of Massachusetts

#### *Ex-Officiis*

HIS HONOR EBEN S. DRAPER  
Lieutenant Governor

HON. GEORGE H. MARTIN  
Secretary Board of Education

Appointed by the Governor and Council

JACOB ROGERS, Lowell, 1908  
Banker

FRANKLIN W. HOBBS, Brookline, 1910  
Treasurer Arlington Mills

On the part of the City of Lowell

#### *Ex-Officiis*

HON. FREDERICK W. FARNHAM  
Mayor of Lowell

A. K. WHITCOMB  
Superintendent of Public Schools

WILLIAM H. BROWN  
Chairman Board of Aldermen

JAMES H. LEIGHTON  
President Common Council

By appointment of the Lowell Textile Council

MICHAEL DUGGAN, 1907

### Permanent Trustees

ALEXANDER G. CUMNOCK, Lowell, Treasurer Appleton Company  
EUGENE S. HYLAN, Lowell, Treasurer New England Bunting Company  
ARTHUR G. POLLARD, Lowell, President Lowell Hosiery Company  
FREDERIC S. CLARK, Boston and North Billerica, Treasurer Talbot Mills  
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THOMAS WALSH, Lowell, Superintendent Hamilton Print Works  
HAVEN C. PERHAM, Lowell, Treasurer Kitson Machine Shop  
JAMES T. SMITH, Lowell, Attorney-at-Law  
WALTER E. PARKER, Lawrence, Agent Pacific Mills  
J. W. C. PICKERING, Lowell, President Pickering Manufacturing Company  
WILLIAM M. WOOD, Andover, President American Woollen Company  
GEORGE E. KUNHARDT, Lawrence and New York, Woollen Manufacturer  
FRANK E. DUNBAR, Lowell, Attorney-at-Law, and President Appleton Company  
JOSEPH L. CHALIFOUX, Lowell, Merchant  
FRANKLIN NOURSE, Lowell, Agent Lawrence Manufacturing Company  
CHARLES H. HUTCHINS, Worcester, President Crompton & Knowles Loom Works  
FREDERICK A. FLATHER, Lowell, Treasurer Boott Mills  
HENRY A. BODWELL, Andover, Supt. Smith & Dove Manufacturing Co. Class of 1900  
WILLIAM E. HALL, Lowell, Treasurer Shaw Stocking Company

### Additional Trustees Elected by Alumni Under Act of 1905

For Four Years, from July 1, 1906.

ROYAL P. WHITE, Class of 1904, Superintendent Stirling Mills, Lowell, Mass.

For Three Years from July 1, 1906.

WILLIAM R. MOORHOUSE, Class of 1901, Color Chemist, Cassella Color Co., Boston, Mass.

For Two Years from July 1, 1906.

JAMES F. SYME, Class of 1900, of the firm of H. T. Murdock & Co., Proctorsville, Vt.



GENERAL VIEW OF SCHOOL. MERRIMACK RIVER AND CANAL.

## GENERAL COMMITTEES

### FINANCE

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### BUILDING AND LEGISLATIVE

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FREDERICK A. FLATHER      A. G. POLLARD      JAMES T. SMITH  
FREDERIC S. CLARK      ALVIN S. LYON      JACOB ROGERS

### WAYS AND MEANS

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FREDERIC S. CLARK      WALTER E. PARKER  
ROYAL P. WHITE

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ALVIN S. LYON      FREDERIC S. CLARK  
HENRY A. BODWELL

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FRANKLIN NOURSE, Chairman      WILLIAM E. HALL

#### *Woolen and Worsted Spinning*

FRANKLIN W. HOBBS, Chairman      FREDERICK A. FLATHER

#### *Weaving*

ALVIN S. LYON, Chairman      WALTER E. PARKER

#### *Chemistry and Dyeing*

THOMAS WALSH, Chairman      FREDERIC S. CLARK

#### *Decorative Art*

JAMES T. SMITH, Chairman      FREDERICK LAWTON

#### *Designing and Finishing*

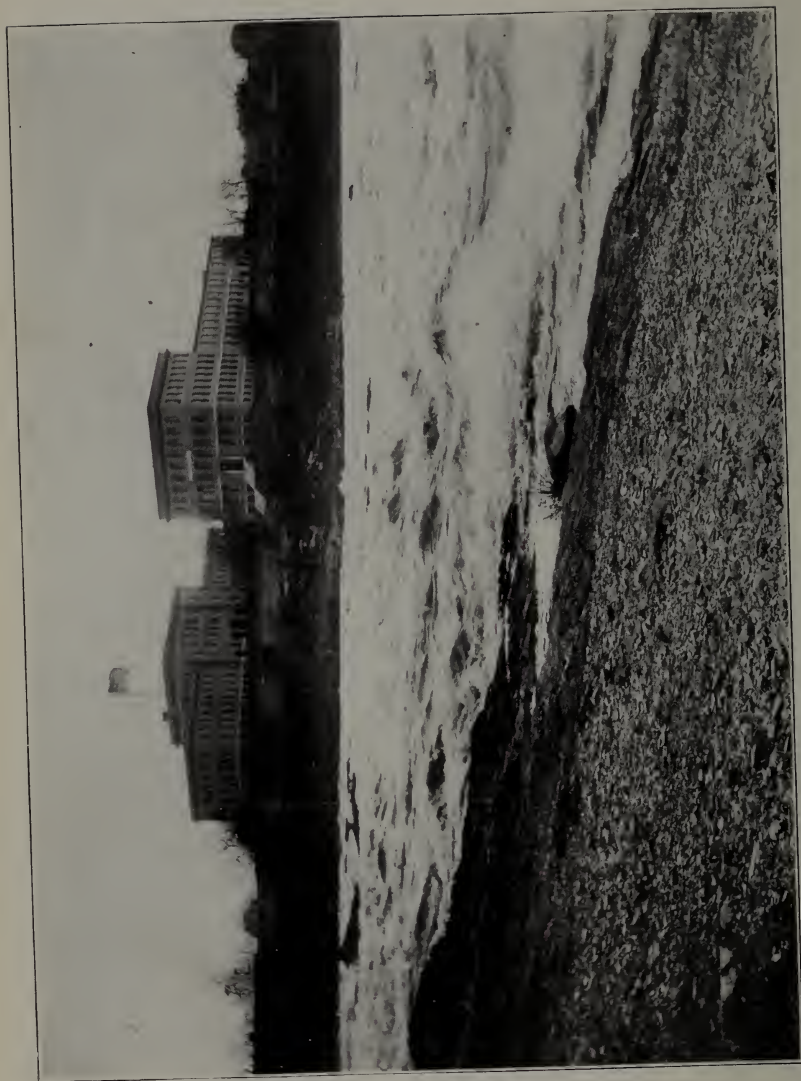
FREDERIC S. CLARK, Chairman      ROYAL P. WHITE

#### *Mechanical and Electrical Engineering*

HENRY A. BODWELL, Chairman      HAVEN C. PERHAM

#### *Athletics*

JAMES T. SMITH, Chairman  
WILLIAM R. MOORHOUSE      ROYAL P. WHITE



FALMOUTH STREET BUILDING

VIEW FROM SOUTH-EAST

SOUTHWICK HALL

## ADMINISTRATION

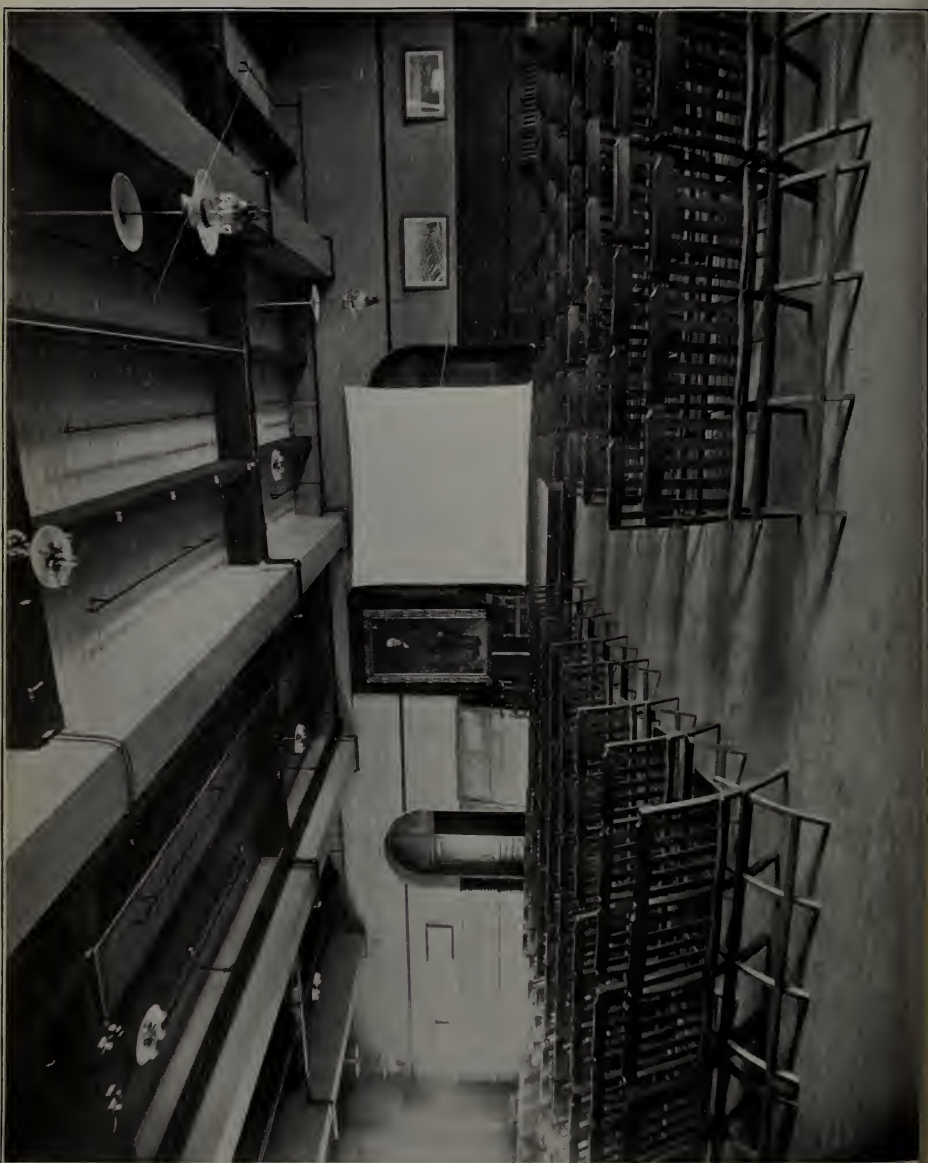
CHARLES H. EAMES, S. B., Principal of the School

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### Officers of Instruction

- FENWICK UMPLEBY,  
Head Instructor, Textile Design and Fabric Structure
- LOUIS A. OLNEY, A. C.,  
Head Instructor in Chemistry and Dyeing
- WILLIAM NELSON,  
Head Instructor in Warp Preparation and Weaving
- EDGAR H. BARKER,  
Head Instructor in Woolen and Worsted Yarns
- STEPHEN E. SMITH,  
Head Instructor in Cotton Yarns and Knitting
- GEORGE H. PERKINS, S. B.,  
Head Instructor in Mechanical Engineering
- ARTHUR A. STEWART,  
Head Instructor in Finishing
- G. CARL SPENCER, S. B.,  
Instructor in Chemistry
- ARTHUR F. FERGUSON,  
Instructor in Textile Design
- JOSEPH WILMOT,  
Instructor in Power Weaving
- JOHN R. WALMSLEY,  
Instructor in Power Weaving
- ROBERT R. SLEEPER,  
Instructor in Dyeing
- JOHN B. REED, A. B.,  
Instructor in Chemistry
- EUGENE W. CLARK, JR.,  
Instructor in Free Hand Drawing and Decorative Art
- LOUIS F. BLUME, E. E.,  
Instructor in Electricity, Physics and Mathematics







### Officers of Instruction—Continued

HERBERT J. BALL, S. B.,	Instructor in Mechanical Engineering
RUSSELL W. HOOK,	Instructor in Dyeing
JOHN N. HOWKER,	Instructor in Wool Sorting and Scouring
HENRY B. ARUNDALE,	Instructor in Woolen and Worsted Yarns
HENRY H. CROMPTON,	Instructor in French Spinning
STEWART MACKAY,	Instructor in Hand Loom Weaving
ELIZABETH WHITNEY,	Instructor in Freehand Drawing
PAUL E. KUNZER, PH. D.,	Instructor in Commercial Languages
FREDERICK A. WOOD, PH. D.,	Instructor in English

### Faculty

CHARLES H. EAMES	EDGAR H. BARKER
FENWICK UMPLEBY	GEORGE H. PERKINS
LOUIS A. OLNEY	STEPHEN E. SMITH
WILLIAM NELSON	ARTHUR A. STEWART

## 1908

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## CALENDAR

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### 1907

First entrance examinations, June 17 and 18 and 24 and 25, 10 a. m.

Fall entrance examinations, September 9 and 10, at 10 a. m.

Re-examinations and examinations for advanced standing, commence  
September 14, at 9 a. m.

Entrance examinations for evening students, Thursdays', commencing  
September 19, at 7 p. m., continuing until opening of classes.

Day school year begins Tuesday, Sept. 24.

Evening school year begins Monday, October 14.

Thanksgiving recess, Thursday, Nov. 28 to Saturday, Nov. 30, inclusive.

Christmas recess, Saturday, Dec. 21, to Thursday, Jan. 2, 1908, inclusive.

### 1908

Semi-annual examinations begin Tuesday, January 21.

Second term begins Monday, February 3.

Annual examinations begin Tuesday, May 19.

Certificates awarded to Evening Graduates, May 7.

Diplomas awarded to Day Graduates, Thursday, June 4.

Entrance examinations, June 22 and 23, at 10 a. m.

There will be no sessions of the school on Washington's birthday or on  
Patriots' Day.



## The Lowell Textile School

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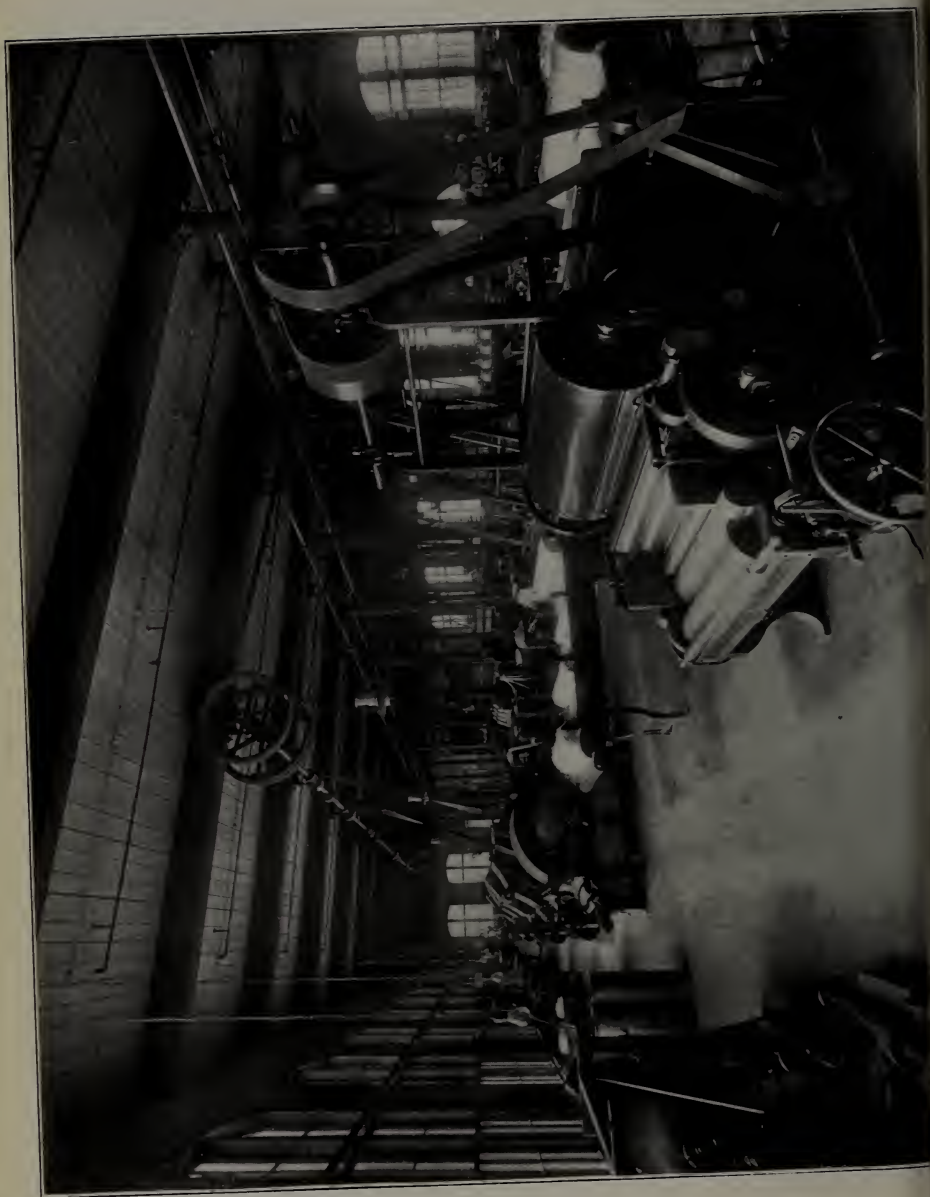
The Lowell Textile School was established, and is managed, by the Trustees of the Lowell Textile School of Lowell, Massachusetts, "for the purpose of instruction in the theory and practical art of textile and kindred branches of industry," as set forth in the act of incorporation.

The movement for the establishment of the School dates from June 1, 1891, but it was not opened for instruction until February 1, 1897.

Not only did the normal progress of the textile industry require such a school, but through the rapid development of the manufacture of the coarser cotton fabrics in the southern states, a crisis had arrived in the leading industry of New England which could only be met by wider and more thorough application of the sciences and arts for the production of finer and more varied fabrics.

Modeled on the lines of the departments of the higher Polytechnic Institutes, it offers thorough instruction in the elements and principles of the sciences and arts applicable to textile and kindred branches of industry and also in their application to the manufacture of all varieties of textile fabrics, and the machinery required therefor.

In industrial education the distinction between Trade and Technical Industrial Schools is coming to be understood. The Lowell School belongs to the latter class. Beginning with limited equipment, instruction staff, and means, instruction at first was by Mill or Trade school methods—the pupil was brought directly to the machine, its parts explained to him, and its operation in manufacturing. The curriculum was, however, rapidly extended, department after department opened and equipped, and commodious and well adapted buildings provided for a permanent home.





While the progress of invention and the demands of ever changing markets will compel constant improvement in methods and additions to the very extensive equipment, with this catalogue substantially closes the period of establishment with all departments open for instruction in all branches of the textile art under an extensive and able corps of instructors and assistant instructors.

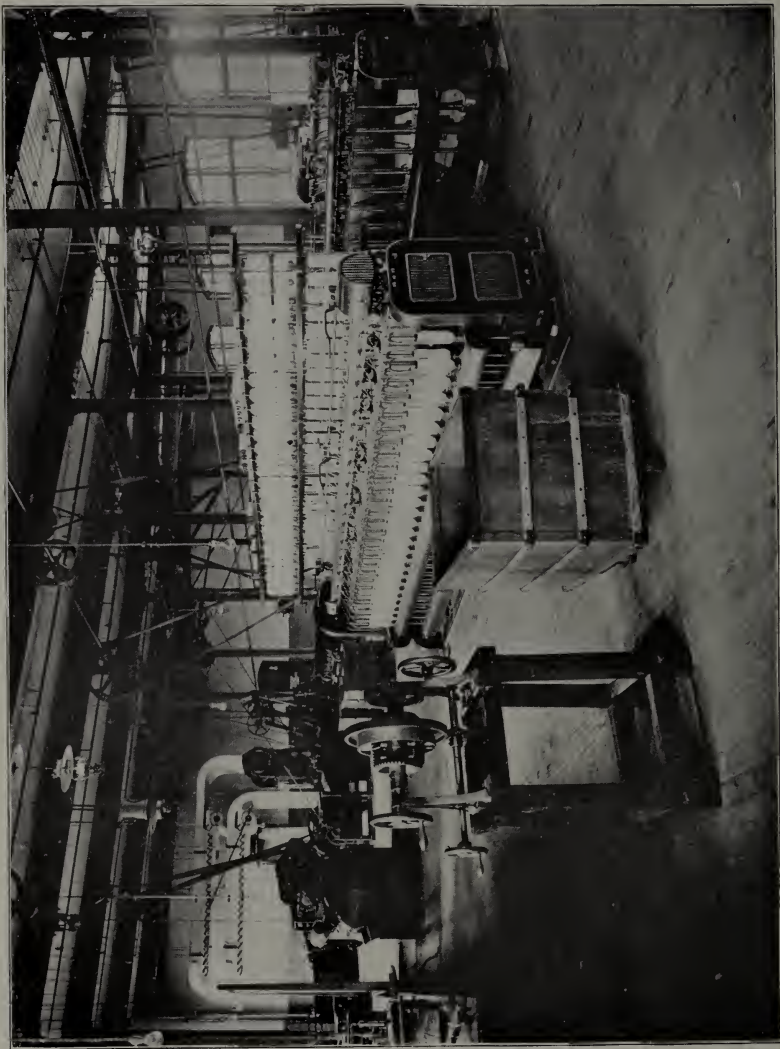
Of the incorporators the permanent trustees (limited to twenty) are mainly representatives, as president, treasurer, agent, or superintendent, of the management of great textile or textile machine corporations of the Commonwealth, and associated with them are, ex-officiis, His Honor, the Lieutenant Governor and the Secretary of the State Board of Education, and two trustees appointed for four-year terms by the Governor and Council. Also the Mayor, Superintendent of Schools, the presiding officers of the two branches of the City Council, and a representative of the textile council of the city of Lowell. At the session of 1905 the Legislature authorized the graduates of the school to elect two additional trustees, and by an act of 1906 the number was increased to four for four-year terms.

By the terms of the by-laws at least three-fourths of the permanent trustees must be persons "actually engaged in or connected with textile or kindred manufactures."

Lowell, Massachusetts, is called the "Mother Textile City of America," and in locating the school at this center a considerable advantage is secured for the reason that every commercial fibre is utilized in the products of the great Merrimack Valley Textile district. The practical work of the school is therefore kept closely in touch with the several branches of the industry which are included in the courses of study.

His Excellency, Governor Roger Wolcott, formally opened the school on January 30, 1897, there being present a large and representative gathering of gentlemen from the textile industries in all portions of New England. The regular classes of the school were opened on February 1, 1897, and have been regularly conducted since that time.

His Excellency, Governor John L. Bates, dedicated the buildings forming the permanent home of the school on February 12,



COTTON YARN DEPARTMENT  
FLY FRAMES

1903, in the presence of a large number of guests representing the Legislature as well as the educational, textile, commercial interests of the Commonwealth.

It is found as time goes on that the applicants for day classes should enter more thoroughly prepared, and it now seems advisable that all students should enter the Lowell Textile School with a preparatory training which is the equivalent of that afforded by the regular four-year course of a standard high school. Even in such cases it is necessary to include in the curriculum of this school the branches of General Chemistry, Decorative Art, Mechanics and Advanced Mathematics. These subjects must be taught in a most thorough manner, for upon this depends the value and standing of the graduate in the great textile industries. While one may acquire at the school thorough knowledge of the principles of the sciences applicable in widely diverse lines of industry, the principles of science and art are taught with the particular view to their application to textile problems and processes. For graduates of universities and scientific institutions, special applied textile courses are offered or opportunities for experimental and original research work.

The mechanical equipment of the school includes the best makes of textile machinery, and these machines, while built as they would be for regular work, are, so far as possible, adapted to the experimental work which is of particular value in such an institution as this.

There is a more varied equipment in this school than in any other, either in America or Europe, and it is now possible to convert the raw stock into the finished fabric, within the school.

The growth of the school has been constant, as is evident from the fact that when it was opened February 1, 1897, there were 32 day and 110 evening pupils. January 1, 1907, the roster showed 128 day pupils and 580 evening pupils or 708 in all.

On January 1, 1903, the School was transferred from the rented quarters that it had occupied for five years to the site and buildings where it is permanently located.

The site is a commanding one, consisting of about eighteen acres at a high elevation, on the west bank of the Merrimack





River, extending to and overlooking the rapids of Pawtucket Falls, the first to be utilized for power weaving in America on an extensive scale. The site was contributed by Frederick Fanning Ayer, Esq., of New York City, and the Proprietors of the Locks and Canals on the Merrimack River. To this site has been added three acres through the continued liberality of Mr. Ayer. The buildings consist of Southwick Hall, Kitson Hall, and one on Falmouth Street not yet named.

Southwick Hall includes a central mass 90 x 90 ft., having three stories and two wings 80 x 85 ft. with two stories and a well lighted basement. The building is pierced in the center by an arched way from which access is had to the wings and to the central courtyard. An Industrial Chemistry Laboratory for the manufacture of dyes from the crude material was provided at the beginning of the year in the Chemistry basement of this building.

Kitson Hall makes a right angle with Southwick Hall and is 60 x 252 ft. with one story and a basement. It is occupied by the Cotton Yarn Department and heating, lighting, ventilating and power plant. The capacity of Kitson Hall has been doubled this year permitting of an extension of the Finishing Department, a Machine Shop, Evening Drawing Room, Students' Athletic Rooms, Store Rooms, etc.

Falmouth Street building forms the third side of the quadrangle and consists of two portions, one 75 x 130 ft., two stories, and the head house 70 x 80 ft., three stories and basement. This building is occupied by the departments of weaving and wool yarns. The head house provides for an extension of these departments, for wool scouring, carbonizing, conditioning, etc., and for knitting.

The buildings are all faced with light brick with granite and Indiana lime stone trimmings and are of modern mill construction adapted to educational uses. The floor space of the School is quadrupled in the new home, permitting of a very large increase in equipment and is now occupied by the several departments as follows:



WOOLEN AND WORSTED YARN DEPARTMENT



Cotton Spinning and Knitting .....	12,000	sq. ft.
Woolen and Worsted Spinning .....	20,700	" "
Decorative Art and Textile Design .....	12,400	" "
General Chemistry and Dyeing Laboratories .....	14,000	" "
Commercial Dyeing .....	4,570	" "
Industrial Chemistry .....	1,572	" "
Finishing Rooms .....	7,000	" "
Power Weaving .....	15,600	" "
Mechanical and Electrical Engineering .....	13,600	" "

The additional floor space is devoted to Administration Offices, Library, Assembly Halls, Class Rooms, Store Rooms, Power Heating and Ventilating Plant, etc.

Southwick Hall was contributed by the Commonwealth of Massachusetts and Frederick Fanning Ayer, Esquire, of New York City, and is a memorial to Royal Southwick, a leading textile manufacturer, a public man of earlier days, and a maternal ancestor of Mr. Ayer.

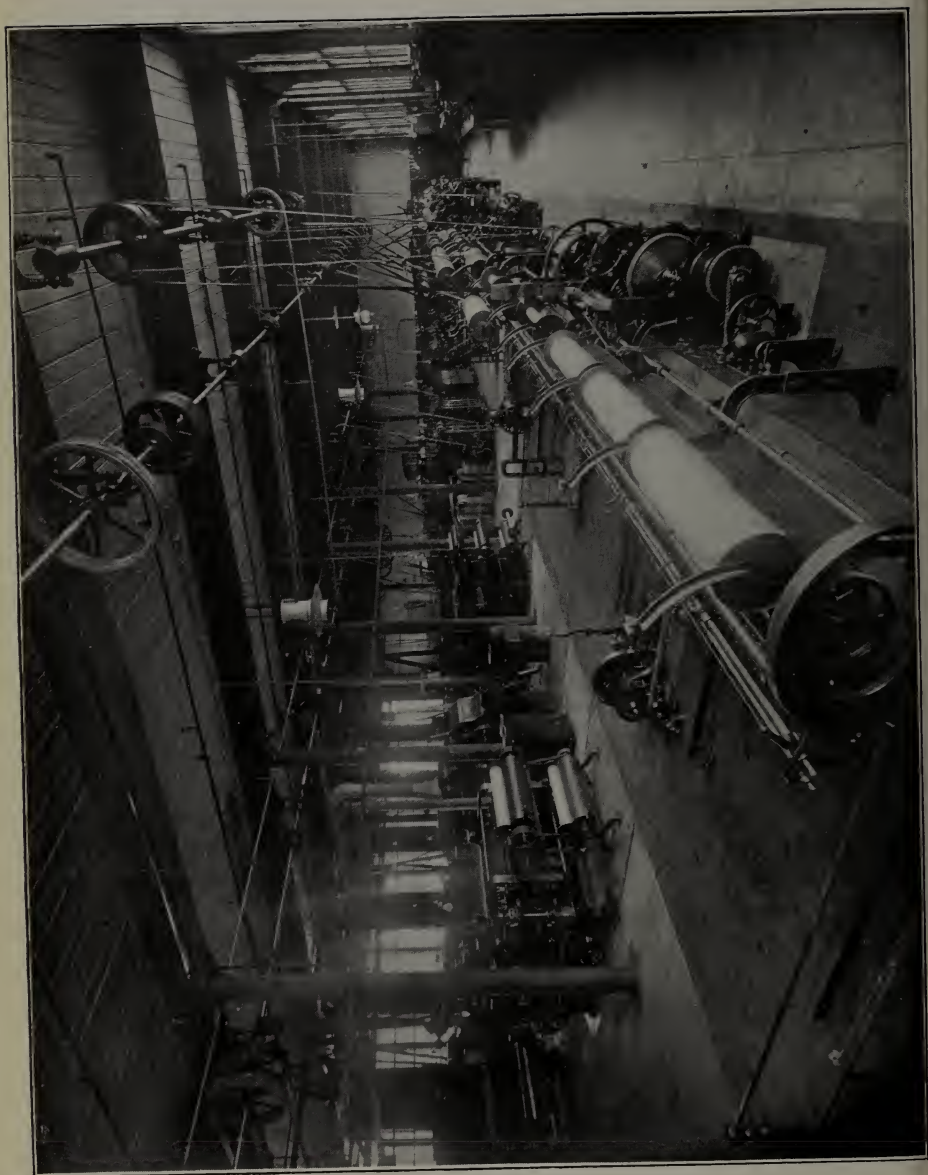
Kitson Hall, dedicated to the memory of Richard Kitson, was contributed by Charlotte P. Kitson and Emma K. Stott, his daughters; the Kitson Machine Company of Lowell, founded by him, was also a generous contributor.

### DAY CLASSES

These are especially intended for the instruction of those whose intention it is to enter the business of textile manufacturing in any branch. The courses are sufficiently complete to enable one to start without any previous acquaintance with textiles; but at the same time those who have been engaged in such business and wish to improve their knowledge and experience, can with profit pursue a course of study at the school.

Each course covers a period of three years, at the end of which time the regular diploma of the school is awarded.

There is one term of preliminary instruction, which is common to all courses. At the end of this term, each student is required to select the course he is to follow in his subsequent studies, and the instruction given from this point is specialized to suit each course.



The five regular diploma courses are :

- I. Cotton Manufacturing.
- II. Wool Manufacturing.
- III. Designing. General Course.
- IV. Chemistry and Dyeing.
- VI. Textile Engineering.

### EVENING CLASSES

It is intended to give evening instruction to those who are engaged during the day in mills and work shops, to enable them to perfect their knowledge of the branches in which they work, to acquire knowledge of other processes than those in which they are regularly engaged, and to complete in the course of several winters, a thorough technical education without interfering with their daily duties.

The courses offered are similar to those of the day ; but less time is devoted to the machine or laboratory work, since in most cases this is of small moment. Ordinarily the handling of the machinery is a part familiar to most of the students through contact with it in the day time, and in such cases the explanations and calculations are of the greater importance. In some cases it is possible to pursue two courses together, but this depends always on the arrangement of the schedule for any particular year.

All Evening Courses are free to residents of Lowell. All applicants must present satisfactory credentials showing that they are graduates of a Grammar School or school of higher standing, or they must pass entrance examinations in Arithmetic and English. For the first subject a short composition must be written on a given theme, and a certain amount must be written from dictation. In arithmetic the applicant must show suitable proficiency in addition, subtraction, multiplication, division, common and decimal fractions, percentage, ratio and proportion.

Courses are offered in :

- I Cotton Spinning—2 years.
- II. (a) Woolen Spinning—1 year.  
(b) Worsted Spinning—3 years.



WOOLEN AND WORSTED DEPARTMENT



- III. Designing—3 years.
- IV. Chemistry and Dyeing—4 years.
- V. (a) Cotton Weaving—1 year.  
(b) Woolen and Worsted Weaving—1 year.  
(c) Dobby and Jacquard Weaving—1 year.
- VI. Mechanics and Electricity—3 years.
- VII. Woolen and Worsted Finishing—1 year.

Course VI includes instruction in mechanism, electricity, steam engineering and mechanical drawing.

Classes are also formed for mathematics, freehand and architectural drawing.

List of subjects embraced in each course is similar to that of the day and may be found beginning on page 82.

For the satisfactory completion of any of the above numbered courses, the certificate of the school will be awarded; the diploma of the school will be awarded in exchange for certificate of satisfactory completion of those subjects which go to make up any one of the regular diploma courses.

Fee for each course for all except residents of Lowell, is \$5.00 per year. All students, whether from Lowell or not, taking Chemistry and Dyeing Course, are required to make a deposit of \$5.00 at the commencement of the course. This is to cover the cost of laboratory breakages, and at the end of the year any unexpended balance is returned or an extra charge made for the excess breakage.

The schedule showing the arrangements of classes for each term will be announced at the opening of each term.

## WOMEN'S DEPARTMENT

Among the many fields in which woman has entered, none has been found in which her natural refinement of taste and skill can be used to better advantage than in designing; but natural ability, though the prime requisite, is by no means all, for a





certain amount of technical knowledge must be gained to achieve success. This department combines decorative art and textile design, and regular attendance is required as in other departments.

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## EQUIPMENT

The equipment of machinery, inventoried January 1, 1907, at \$182,237.95, is the most varied for textile educational purposes, and is being constantly augmented.

### COTTON DEPARTMENT

#### *Ginning*

- One 50 saw gin made by Daniel Pratt Gin Co., Prattville, Ala.
- One Prior Roller Gin

#### *Opening, Picking and Waste Machinery*

- One outfit of Kitson Picking Machinery from works of Kitson Machine Co., Lowell, Mass., including:
  - One No. 7 Opener with Automatic Feeder connected by Robinson patent Cleaning Trunk to
  - One 40 in. Single Beater Breaker Lapper with Condenser and gauge box feed.
  - One 40 in. Single Beater Intermediate Finisher Lapper with Perham & Davis Sectional Plate Evener, apron to double four laps.
  - One 40 in. Single Beater Finisher Lapper with Perham & Davis Sectional Plate Evener, apron to double four laps, Kirschner Patent Carding Beater.
  - One Roving Waste Opener.
  - One Thread Extractor.

#### *Carding, Combing and Drawing*

The following machinery made by the Lowell Machine Shop, Lowell, Mass.

- One Top Flat Card.
- Three Revolving Flat Cards.
- Two Railway Heads.
- Two Drawing Frames.
- From Kitson Machine Co.,
  - Stripping Rolls, etc.



WOOL SCOURING AND CARBONIZING

From the Whitin Machine Works, Whitinsville, Mass.

One 40 in. Revolving Flat Card.

Card Grinding Rolls.

One Ribbon Lapper.

One Six Head Comber.

From the Mason Machine Works, Taunton, Mass.

One Sliver Lap Machine.

One Comb.

*Roving, Spinning and Twisting*

From Lowell Machine Shop, Lowell, Mass.

One Slubber.

One Intermediate.

One Fine Frame.

One Jack Frame.

Three Ring Spinning Frames.

One Spinning Mule.

One Spooler.

One Wet and Dry Twister.

From Whitin Machine Works, Whitinsville, Mass.

Two Ring Spinning Frames.

*Miscellaneous Machinery of this Department includes:*

From the Lowell Machine Shop, Lowell, Mass.

One Reel.

One Model Fine Fly Frame.

One Model Fly Frame Compound.

One Model Card Feed.

One Model Flat Grinding Device.

One Model Scroll Setting Device.

From The Universal Winding Co.

One Six head Universal Winder, for cones, tubes or multiple winding.

From Draper Co., Hopedale, Mass.

One Weeks Banding Machine.

Miscellaneous Machines.

One Yarn Inspection Machine with black boards.

One Barbour Knotter.

Two Yarn Reels and Grain Scales.

One Power Yarn Tester.

One Twist Counter.



WOOL SORTING AND CARBONIZING

### Knitting Department

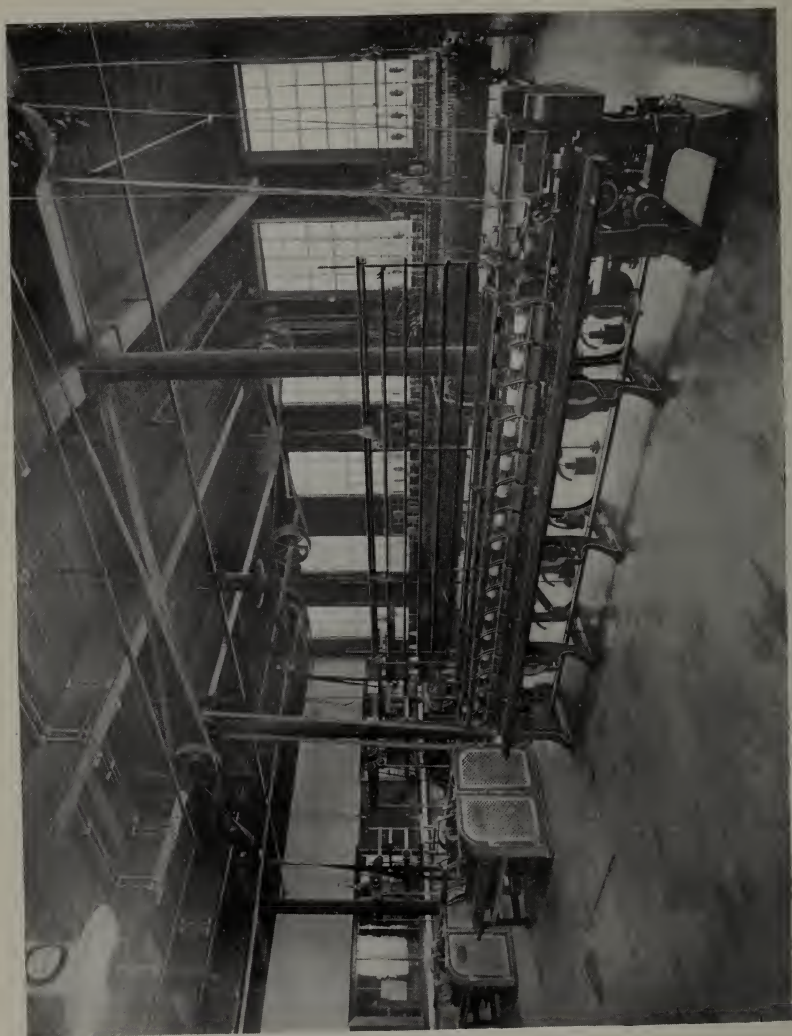
- One Mayo "Acme" Full Automatic Seamless Knitting Machine from Mayo Knitting Machine and Needle Co., Franklin Falls, N. H.
- One Geo. D. Mayo Full Automatic Seamless Knitting Machine from Geo. D. Mayo Machine Co., Laconia, N. H.
- One Brinton Full Automatic Seamless Knitting Machine from H. Brinton Co., Philadelphia, Pa.
- One McMichael and Wildman Rib Top Knitting Machine from Wildman Mfg. Co., Norristown, Pa.
- One Wildman Rib Knitting Machine, with Knee and Ankle Splicer and Automatic Stop Motion, Wildman Mfg. Co., Norristown, Pa.
- One Brinton Rib Knitting Machine with Knee and Ankle Splicer and Plaiter from H. Brinton Co., Philadelphia, Pa.
- One Wildman Rib Top Machine with Automatic Stop Motion from Wildman Mfg. Co., Norristown, Pa.
- One Grosser, One Section Jacquard Machine from Grosser Knitting Machine Co., N. Y.
- One Lamb Sweater Machine from Lamb Knitting Machine Co., Chicopee Falls, Mass.,
- One Lamb Glove Machine from Lamb Knitting Machine Co., Chicopee Falls, Mass.
- One Branson Stocking Machine from Branson Knitting Machine Co., Philadelphia, Pa.
- One Beattie Looper from Beattie Machine Works, Cohoes, N. Y.
- One Hepworth Looper with Trimming Attachment from J. W. Hepworth and Co., Philadelphia, Pa.
- Five Sewing Machines, including two Shell Stitch Machines and three 2 and 3-thread Overseaming and Crocheting Machines, from Merrow Machine Co., Hartford, Conn.
- Five Sewing Machines, including machines for Overseaming, Double Stitch Covering, Seaming and Welting, Vest Finishing, etc., from Union Special Sewing Machine Co., Boston, Mass.

### WOOLEN AND WORSTED DEPARTMENT

#### *Wool Sorting and Grading*

This department is thoroughly equipped with benches, baskets, etc., for sorting wool in a convenient manner, and in addition samples of all grades and types of wool and other fibres.





FRENCH SPINNING DEPARTMENT



### *Scouring and Carbonizing*

Wool Scouring Machinery, C. G. Sargent's Sons Corp., Graniteville, Mass., consisting of

Cone Duster for Grease Wool.

Two Scouring Bowls, each 17 ft. x 24 in., with Parallel Rakes.

One Automatic Feeder for Scouring Bowls.

One Automatic Feeder for Dryer.

One Single Apron Dryer.

Carbonizing Screw Acid Tank.

Carbonizing Duster, with Crush Rolls.

From North Chelmsford Machine Co.

One Rinse Box.

From Schaum & Uhlinger.

One Hydro Extractor.

### **Woolen**

#### *Picking*

One Parkhurst Burr Picker, Atlas Mfg. Co., Newark, N. J.

One Mixing Picker, Davis & Furber Machine Co., North Andover, Mass., equipped with Improved Mixing Picker Feed, and Spencer Oiler, both made by George S. Harwood & Son, Boston, Mass.

#### *Carding*

One set of Woolen Cards, including:

First Breaker, Second Breaker and Finisher, Davis & Furber Machine Co., North Andover, Mass.; this set of cards equipped with Bramwell First Breaker Feed, George S. Harwood & Son, Boston, Mass.; Torrance Balling Head and Creel, (Torrance Mfg. Co., Harrison, N. J.) between First Breaker and Second Breaker; Apperly Feed, (George S. Harwood & Son, Boston, Mass.,) between Second Breaker and Finisher, and Combination Rub Rolls and Apron Condenser, (Davis & Furber Machine Co., North Andover, Mass.,) on Finisher. These cards are for medium and coarse work.

One set of Davis & Furber Woolen Cards including:

First Breaker, Second Breaker and Finisher. This set of cards equipped with Bramwell First Breaker Feed, (George S. Harwood & Son, Boston, Mass.,); Apperly Feed with Kemp Traveller, (George S. Harwood & Son, Boston, Mass.,) between First Breaker and Second Breaker; Bates Feed, (E. V. Bates, Lowell, Mass.,) between Second Breaker and Finisher, and Davis & Furber Double Apron Condenser, on Finisher. These cards are for fine work.

One Sample Mixing Card, Torrance Mfg. Co., Harrison, N. J.



FRENCH SPINNING DEPARTMENT

### *Spinning*

One Spinning Mule, 120 spindles, Davis & Furber Machine Co., North Andover, Mass.; Bobbin Holders, supplied by American Bobbin Holder Co., W. Medway, Mass.

One Spinning Mule, 120 spindles, Johnson & Bassett, Worcester, Mass.; Bobbin Holders supplied by Murdock & Geb, Franklin, Mass.

One 1907 Fancy Yarn Twister, 20 spindles, Davis & Furber Machine Co., North Andover, Mass.

### *Card Grinding*

One Roy Grinding Frame, B. S. Roy & Son, Worcester, Mass.

Two Roy Traverse Grinders, B. S. Roy & Son, Worcester, Mass.

One Entwistle Traverse Grinder, T. C. Entwistle Co., Lowell, Mass.

One Complete set of Carders' Tools, W. H. Brown, Worcester, Mass.

## **Worsted**

### *Carding*

One 50-inch Double-cylinder Worsted Card (4 lickerin), Davis & Furber Machine Co., North Andover, Mass., equipped with Bramwell Feed, George S. Harwood & Son, Boston, Mass.

### *Backwashing*

One Double Bowl, Five Cylinder Backwasher, with Gill Box, Taylor-Wadsworth & Co., Leeds, Eng., equipped with blueing motion, oiling motion, and Layland Patent pressure motion.

### *Gilling*

One Doubling Balling Head Gill Box (with double screws), Lowell Machine Shop, Lowell, Mass.

One Weigh Gill Box and Creel, Lowell Machine Shop, Lowell, Mass.

### *Combing*

One Baller, (punch), Crompton & Knowles, Worcester, Mass.

One Noble Worsted Comb, Crompton & Knowles, Worcester, Mass.

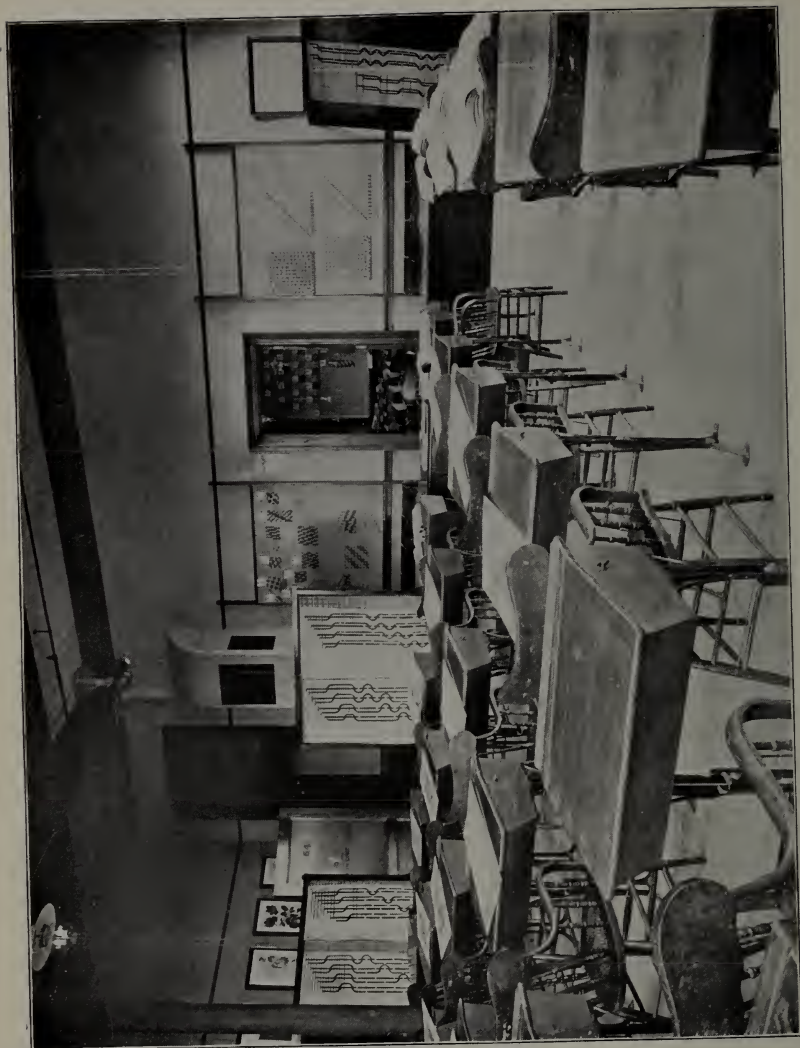
### *Gilling*

One Finishing Can Gill Box, Hall & Stell, Keighley, England.

One Finishing Balling Head Gill Box, Hall & Stell, Keighley, England.

### *Bradford System of Drawing, Spinning and Twisting*

The following Drawing, Spinning and Twisting Machinery, from Prince Smith & Son, Keighley, England.



TEXTILE DESIGN DEPARTMENT

- One Revolving Creel for 12 Balls.
- One Double Head Can Gill Box.
- One 2 Spindle Gill Box.
- One 2 Spindle Drawing Box.
- One 2 Spindle Weigh Box.
- One 4 Spindle First Finisher.
- One 12 Spindle Dandy Reducer.
- One 12 Spindle Cap Spinner.
- One 12 Spindle Flyer Spinner.
- One 12 Spindle Ring Spinner.
- One 12 Spindle 2 Fold Cap Twister.
- One 12 Spindle 6 Fold Ring Twister.

The following Drawing, Spinning and Twisting machinery from the Lowell Machine Shop, Lowell, Mass.:

- One 2 Spindle Drawing Box.
- One 6 Spindle Second Finisher.
- One 24 Spindle Dandy Rover.
- One 6 Spindle Cone Reducer.
- One 8 Spindle Cone Rover.
- One 48 Spindle Cap Spinner (4 foot end).
- One 48 Spindle Cap Spinner (5 foot end).
- One 48 Spindle Boyd Ring Twister.
- One Six Gang Universal Winder, equipped for cones or straight tubes, Universal Winding Co., Boston, Mass.
- One Tape Band Sewing Machine, The Singer Mfg. Co., New York.

### *French System of Drawing and Spinning*

The machinery made by the "Societe Alsacienne de Constructions Mechaniques" at Mulhouse, France, consists of the following:

#### FRENCH NAMES

- Gill Box (2 têtes)
- Étirage à Frottoirs (2 têtes)
- Étirage à Frottoirs (2 têtes)
- Étirage à Frottoirs (2 têtes)
- Étirage à Réunion (4 Peignes)
- Bobinier de Châte (8 Peignes)
- Bobinier (8 Peignes)
- Bobinier (8 Peignes)
- Bobinier (8 Peignes)
- Finisseur (16 Peignes)
- Selfacting à Filer (150 Broches)

#### ENGLISH NAMES

- Gill Box (2 heads)
- 1st Drawing (2 heads)
- 2nd Drawing (2 heads)
- 3rd Drawing (2 heads)
- Reducer (4 Porcupines)
- Slubber (8 Porcupines)
- 1st Intermediate (8 Porcupines)
- 2nd Intermediate (8 Porcupines)
- Rover (8 Porcupines)
- Finisher (16 Porcupines)
- Selfacting Mule (150 Spindles)





FABRIC STRUCTURE AND CLOTH ANALYSIS



### *Yarn Weighing and Testing*

Two Yarn Reels.  
One Roving Reel.  
Three Grain Scales  
One Run Beam  
One Hand Yarn Strength Tester  
Two Twist Counters  
One Barbour Knotter

## POWER WEAVING DEPARTMENT

### *Cotton Warp Preparation*

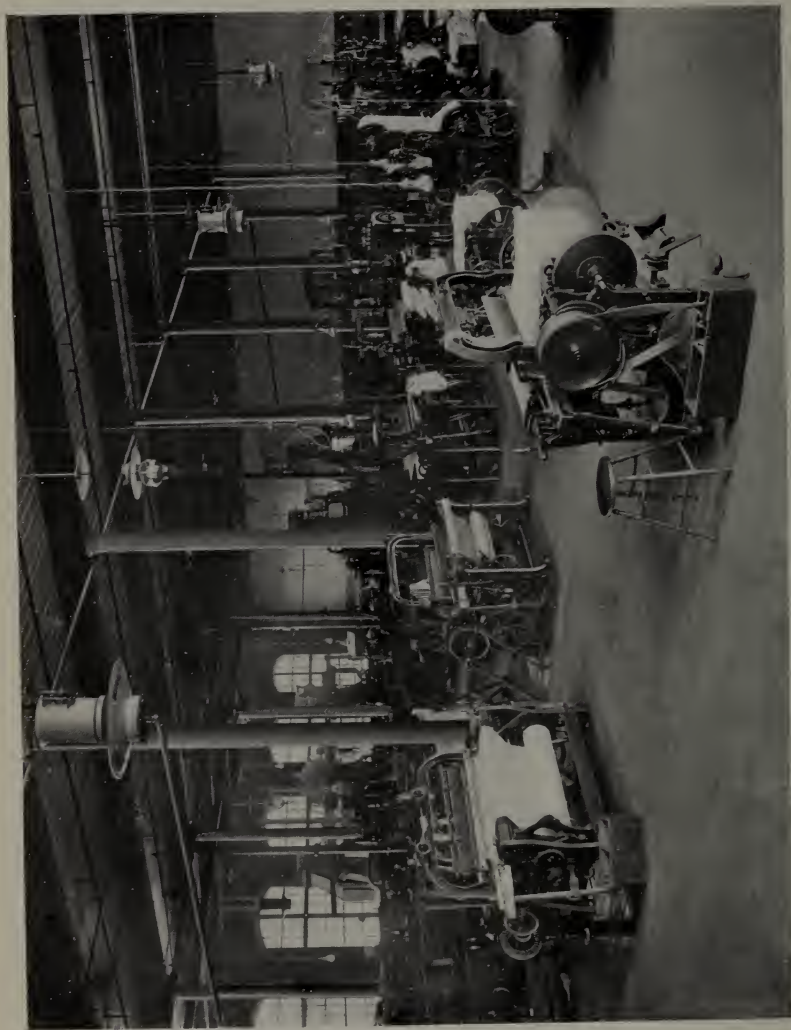
One Spooler, Lowell Machine Shop, Lowell, Mass.  
One Warper, Lowell Machine Shop, Lowell, Mass.  
One Slasher, Lowell Machine Shop, Lowell, Mass.  
One Beamer, T. C. Entwistle Co., Lowell, Mass.  
One Winder, Altemus & Co., Philadelphia, Pa.  
One 400 End Improved Draper Warper, Draper Co., Hopedale, Mass.  
Drawing-in Frames, etc.  
One Pat. Slasher Press Roll, J. Battles & Co., Lawrence, Mass.  
One Pat. Expansion Comb for Warper, T. C. Entwistle Co., Lowell, Mass.  
One Quiller, Johnson & Bassett, Worcester, Mass.  
One Wet and Dry Twister, Draper Co., Hopedale, Mass.  
Set of six inch spools for Warper, Macrodi Fiber Co., Woonsocket, R. I.

### *Woolen and Worsted Warp Preparation*

One Jack Spooler.  
One Dresser.  
One Reel.  
One Beamer.  
One 48 Spool Creel.  
All made by the Davis & Furber Machine Co., North Andover, Mass.  
Also a number of hand warping and beaming frames.

### *Power Weaving*

One 24 Line Hercules Braider.  
One 12 Line Braider.  
One Tubular Braider.  
One Sautach Braider.  
All made by the New England Butt Co., Providence, R. I.  
One plain Northrop Loom, Draper Co., Hopedale, Mass.  
One Improved Northrop Loom, fine sateen, Draper Co., Hopedale, Mass.



POWER WEAVE ROOM

One Northrop Loom with dobby, Draper Co., Hopedale, Mass.  
 One Plain Print Cloth Loom, Whitin Machine Works, Whitinsville, Mass. To this is attached a Kip-Armstrong Warp Electric Stop Motion.  
 One Side Cam Twill Loom, Whitin Machine Works, Whitinsville, Mass.  
 One Twenty Harness Dobby Loom, Whitin Machine Works.  
 One Five Harness Sateen Loom, Lowell Machine Shop, Lowell, Mass.  
 One Plain Print Cloth Loom, Mason Machine Works, Taunton, Mass.  
 One Harriman Automatic Shuttle Changing Loom.  
 And the following looms made by the Crompton-Knowles Loom Works, Worcester, Mass., and Providence, R. I.  
 One Model Dobby Attachment.  
 One Knowles Gingham Loom, 4 boxes.  
 One Knowles Fancy Cotton Loom, with 20 harness dobby, 4 boxes, for fancy leno work.  
 One Knowles Fancy Cotton Loom, with 25 harness dobby.  
 One Knowles Blanket Loom, with 25 harness dobby, 4 boxes.  
 One Knowles Gem Loom, 20 harness, 4 x 4 boxes.  
 One Knowles Worsted Loom, 32 harness, 4 x 4 boxes.  
 Three Knowles Heavy Woolen Looms, 25 harness, 4 x 4 boxes.  
 One Knowles Fancy Loom, with single lift Jacquard.  
 One Knowles Fancy Loom, with double lift Jacquard.  
 One Knowles Fancy Loom, with Jacquard tied up for leno.  
 One Knowles Ingrain Carpet Loom, 4 x 4 boxes.  
 One Crompton Gingham Loom, 4 x 1 boxes.  
 One Crompton Fancy Loom, 6 x 1, with double cylinder, 20 harness dobby.  
 One Crompton Fancy Cotton Loom, with single cylinder, 20 harness dobby.  
 One Crompton Jean Loom.  
 One Stafford Silk Loom, with 1200 hook Halton Jacquard.  
 One Crompton Lappet Loom, with 16 harness dobby.  
 One Crompton Towel Loom, 2 x 1 boxes.  
 One Crompton Ingrain Carpet Loom, 4 x 4 boxes.  
 One Crompton Worsted Loom, 24 harness, 4 x 4 boxes.  
 One Crompton & Knowles Heavy Loom, 20 harness, 4 x 4 boxes.  
 One Crompton & Knowles 72 in. Tapestry Loom, upon which is mounted a 2600 hook Halton Tapestry Jacquard Head.  
 One Lewiston Machine Co. Loom, 4 harness, side cam.  
 One Lewiston Machine Co., Bag Loom.  
 One Kilburn & Lincoln Plain Loom.  
 Eight Lowell Machine Shop Plain Looms.  
 One English Loom, Hattersley.



One Jacquard Piano Card Cutting Machine, John Royle & Sons,  
Paterson, N. J.

One 400 hook Schaum and Uhlinger Jacquard Machine.

*The Silk Preparing Machinery Consists of:—*

One Winder.

One Quiller.

One Warper.

One Beamer.

One Double Frame.

All made by the Atwood Machine Co., Stonington, Conn.

### HAND LOOM DEPARTMENT

Twelve Hand Looms, 2 x 3 boxes, with 20 harness dobby.

Eight Hand Looms, 4 x 4 boxes, with 24 harness dobby.

Six Hand Looms, 3 x 3 boxes, with 32 harness dobby.

Six Hand Looms, 4 x 4 boxes, with 30 harness dobby.

Two Hand Looms, with treadles.

Two Hand Looms, 4 x 4 boxes, with 200 hook Jacquard.

Two Hand Looms, 3 x 3 boxes, 200 hook Jacquard.

Two Hand Looms, 3 x 3 boxes, with 600 hook Jacquard.

### CHEMISTRY AND DYEING DEPARTMENT

*The Chemical Laboratories*

The General Chemistry and Qualitative Analysis Laboratory includes:  
One hundred and twenty laboratory desks, each containing a full set  
of apparatus for the first year's work in chemistry; also gas and  
water fittings, reagents and sinks.

Four Large Double Hoods.

Two Steam Baths.

One Parson's Automatic Gas Generator.

*The Quantitative Laboratory*

One Water Distilling Apparatus.

One Steam Drying Closet and Several Drying Ovens.

One Large Steam Bath.

One Electrolytic Table.

Five Hoods.

Twenty-six laboratory desks, each fully provided with apparatus.

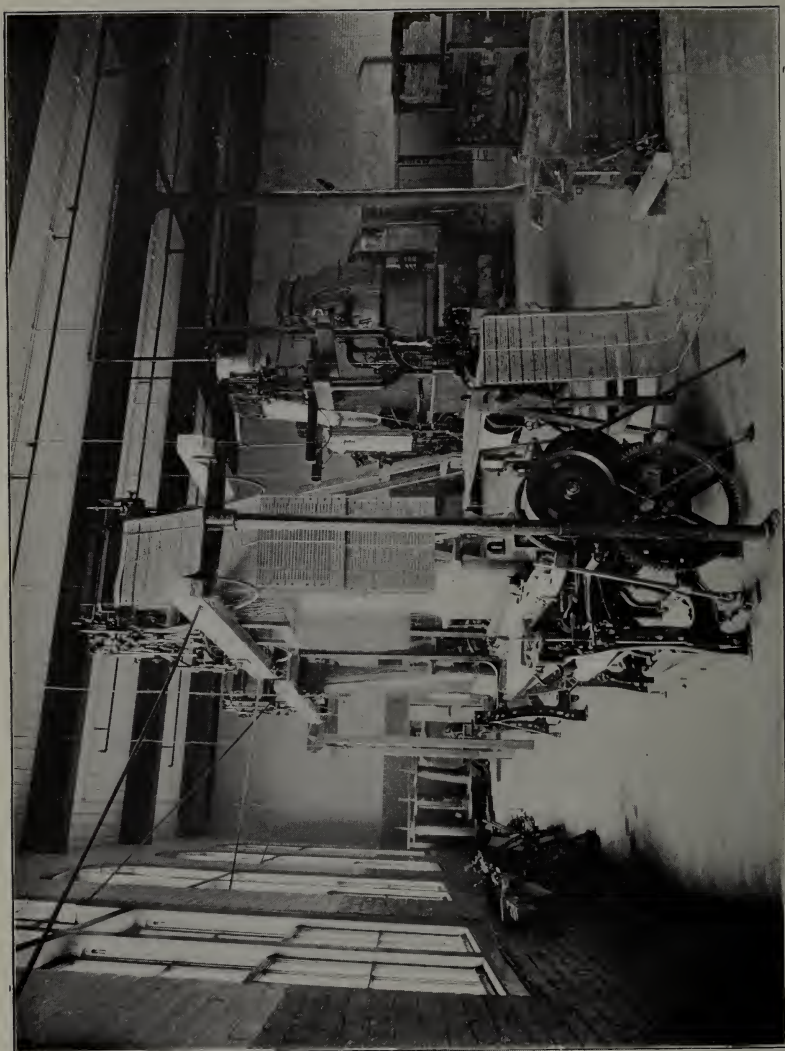
*The Balance Room*

One Large Christian Becker Analytical Balance.

Three Small Christian Becker Analytical Balances.

One Standinger Analytical Balance.





WEAVE ROOM



- One Eimer & Amend Analytical Balance.
- One H. L. Becker's Son & Co. Analytical Balance.

#### *The Combustion Room*

- One Combustion Furnace, 25 burners.
- One Lothar Meyer's Furnace for tubes.
- One Kerosene Burner Muffle Furnace.

#### *The Microscopic and Colorimetric Laboratory*

- Two Benches for microscopical work.
- Three Bausch & Lomb Compound Microscopes.
- One Nachet et Fils Compound Microscope.
- One Tintometer.
- Desk and shelves for the apparatus and reagents necessary for this branch of the work.
- Adjoining this laboratory is a dark room for Spectrum Analysis, Photometric Work, etc.

#### *The Assistant Instructors' Laboratory*

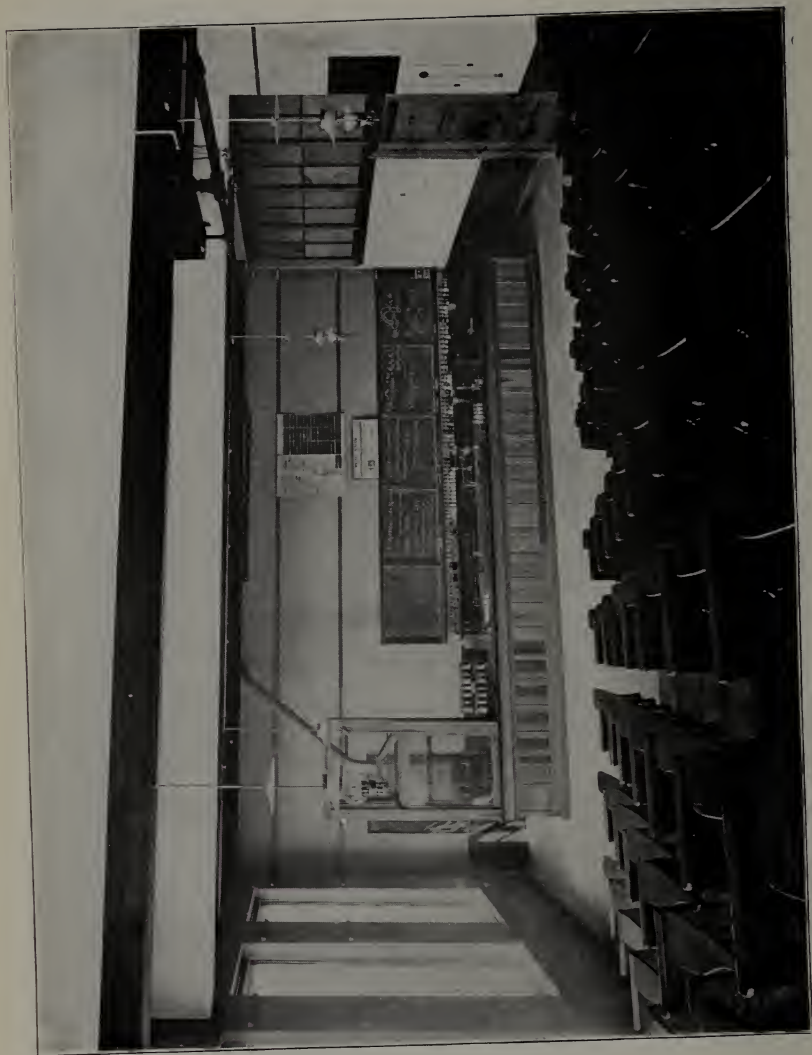
- One Large Case for chemicals.
- One Double Hood.
- One Copper Water Bath.
- One Soapstone Sink with a drain board.
- Benches, desks and complete fittings for water, gas and suction.

#### *The Private Laboratory*

- One Christian Becker Balance.
- One large B. & L. Microscope.
- One Parr Calorimeter.
- One Case for Chemicals and Apparatus.
- Three Laboratory Benches, with necessary fittings.
- One Large Hood.
- One Steam Bath.
- One Experimental Dye Apparatus.
- One Porcelain Sink and Drain Board.

#### *The Chemical Lecture Room*

- Is provided with a lecture table fully equipped with gas, water, sinks, a hood and sufficient apparatus for lecture experiments.
- An electric arc reflectroscope provided with suitable screen, thus makes it possible to illustrate a lecture either from slides or by cuts, photographs or objects.
- Seats are provided for 80 students, and are arranged on a raised floor so that every student has a full view of the lecture table.
- This room contains various collections of dye stuffs and chemicals for exhibition and for lecture demonstration.



GENERAL CHEMISTRY LECTURE ROOM

### *Experimental Dyeing Laboratory*

The dyeing laboratory is equipped with individual benches, small dyeing apparatus, reels, balances, apparatus for dye testing, such as frames for exposing dyed material to light, and a complete collection of dyestuff samples and sample cards.

One Small Hydro-Extractor, from W. H. Tollhurst & Son, Troy, N. Y.  
Twenty-four Steam Jacketed Experimental Dyeing Machines.

One Drying Chamber.

One Ageing Chamber.

### *Experimental Printing Laboratory*

One Calico Printing Machine, made by Mather & Platt, Oldham, England.

One Iron Jacketed Steaming Chamber from A. Edmeston & Son, Salford, England.

One set of Steam Jacketed Copper Kettles.

### *Industrial Chemistry Laboratory*

One Filter Press, Type E, T. Shriver and Co.

One Single Acting Triplex Plunger Pump, Gould's Mfg. Co.

One Vacuum Drying Apparatus, Norman Hubbard's Sons.

One Surface Condenser, Norman Hubbard's Sons.

One Packard Vacuum Pump, Norman Hubbard's Sons.

One Vacuum Evaporator, Swenson System, American Foundry and Machine Co.

One Centrifugal, C. H. Chavant and Co.

One Double Jar Mill, F. I. Stokes and Co.

One Sturtevant Ore Crusher.

One Sturtevant Pulverizer.

Ten Copper Steam Baths, D. H. Wilson and Co.

One General Electric Company 5 1-2 H. P. Motor.

One 36 in. Ventilating Fan, Mass. Fan Co.

One Autoclave.

Twenty-four Lockers.

Two Concrete Top Tables.

### *Commercial Dyeing Laboratory*

One Kier, Atlantic Works, East Boston, Mass.

One 4 String Dyeing Machine, Rodney Hunt Machine Co., Orange, Mass.

One Mercerizing Machine.

One Raw Stock Dyeing Machine, Klauder-Weldon Dyeing Machine Co., Amsterdam, N. Y.

One Yarn Dyeing Machine, Klauder-Weldon Dyeing Machine Co., Amsterdam, N. Y.



EXPERIMENTAL DYEING LABORATORY

One Jig Dyeing Machine, The Textile-Finishing Machinery Co., Providence, R. I.  
 One Set of Drying Cans, The Textile-Finishing Machinery Co., Providence, R. I.  
 One Chain Dyeing Machine, T. C. Entwistle Co., Lowell, Mass.  
 One Raw Stock Drying Table, Philadelphia Textile Machinery Co., Philadelphia, Pa.  
 One Padding Machine, Arlington Machine Works, Arlington, Mass.  
 One Hydro-Extractor, W. H. Tollhurst & Son, Troy, N. Y.  
 Seven Dye Tubs.  
 One Power Yarn Reel.  
 One Reeves' Variable Speed Device.  
 Two Trucks.

## FINISHING DEPARTMENT

One 2 String Washer, Rodney Hunt Co., Orange, Mass.  
 One Fulling Mill, Rodney Hunt Co., Orange, Mass.  
 One Up and Down, Dry Gig, Curtis and Marble, Worcester, Mass.  
 One Rolling and Stretching Machine, Curtis and Marble, Worcester, Mass.  
 One Up and Down Wet Gig, Curtis and Marble, Worcester, Mass.  
 One Steam Finishing Machine, Curtis and Marble, Worcester, Mass.  
 One Two Cylinder Double Acting Brushing Machine, Curtis and Marble, Worcester, Mass.  
 One 60" 4 Cylinder Sanding and Polishing Machine, Curtis and Marble, Worcester, Mass.  
 One Kicking Mill, James Hunter & Co., No. Adams, Mass.  
 One 6-4 Double Shear, Parks & Woolson, Springfield, Vt.  
 One 6-4 Voelker Rotary Press, G. W. Voelker & Co., Woonsocket, R. I.  
 One Tentering and Drying Machine, John Heathcote, Providence, R. I.  
 One Single Crabbing Machine, H. W. Butterworth & Son, Philadelphia, Pa.  
 One 72" Woolen Napper, Davis & Furber, No. Andover, Mass.  
 One 32" Basket Hydro-Extractor, W. H. Tollhurst & Son, Troy, N. Y.  
 One Measuring Machine, Fabric Measuring and Packaging Co., N. Y., Parks & Woolson.  
 One Sewing Machine, Birch Brothers, Somerville, Mass.  
 Also soap tanks, perch, burling and measuring tables.

## MECHANICAL DEPARTMENT

### PHYSICAL LABORATORY

Through the generosity of a friend of the School a laboratory has been provided with the most approved apparatus for testing the physical





EXPERIMENTAL PRINTING LABORATORY



properties of all fibres, yarns, and fabrics; the equipment includes:

- One Bausch and Lomb D. D. Microscope.
- Two inch, 1 inch, and 1-2 inch regular eyepieces.
- Three-fourths inch (photographic), 2-3 inch, 1-6 inch, 1-12 inch (oil immersion) objectives.
- One Nicol prism polarizer and analyzer.
- One Eye Piece Micrometer.
- One Filar Micrometer, (1 inch equivalent eyepiece) for refined diameter determinations.
- One Standard Glass Stage, divided to 1-10 and 1-100 m. m., with corrections as tested against the International m. m.
- Complete outfit for mounting slides.
- Complete outfit for photo micography.
- Camera Lucida.
- Microtome Sectioning Outfit.
- One Small Skein Testing Machine.
- One set Conditioning Ovens for moisture determination.
- One Yarn Testing Machine, adjusted to test strength, twist, take up, elasticity, and stretch.
- One Hydraulic Cloth Strength Testing Machine.
- One Brown & Sharpe Metre Reel.
- Miscellaneous apparatus for experiments in Mechanics, Heat, Light, Sound and Electricity.

#### POWER, LIGHT, HEAT AND VENTILATION

- One 300 H. P. Aultman and Taylor Horizontal Water Tube Boiler, equipped with U. S. Rocking Grates.
- Two 100 H. P. Stirling Water Tube Boilers.
- These boilers are connected to a Sturtevant Induced Draft Apparatus, including fan, direct connected to the Sturtevant vertical engine and equipped with two way dampers.
- One Sturtevant Smoke Filtering Apparatus.
- One Locke Steam Pressure Regulator for draft engine.
- One Knowles Boiler Feed Pump, 6 in. x 4 in. x 6 in.
- One Warren Webster Feed Water Heater, Filter and Oil Extractor.
- One Payne 14 in. x 14 in. Automatic High Speed Engine of 125 H. P.
- One 9 1-2 in. x 11 3-4 in. Nash Gas Engine of 50 H. P. of the three cylinder type, with speed regulating clutch and hit and miss governor.
- One Motor Driven Air Compressor 5 1-2 in. x 6 in. with a storage tank of 20 cubic feet capacity, 100 lbs. per sq. in. pressure.
- One Complete Sturtevant Double Duct System for heating Southwick Hall. This apparatus is designed to provide the proper amount of fresh warm air called for by the State law as applied to educational institutions, and includes a 9 ft. x 4 ft. fan direct connected to the Sturtevant horizontal engine, drip tank and Knowles automatic return



A VIEW IN COMMERCIAL DYEING LABORATORY



A VIEW IN INDUSTRIAL CHEMICAL LABORATORY

- pump, 4 1-2 in. x 2 3-4 in. x 4 in. arranged to deliver either to the feed water heater or to the boilers direct.
- Complete Ventilation System for Southwick Hall and Falmouth Street Building including 6 direct connected motor driven exhaust fans.
- One Sturtevant Fan and Heater for Kitson Hall and Falmouth Street Building, direct connected to a Sturtevant inverted engine.
- One Cross Oil Filter.
- One Complete Moistening Apparatus installed by the American Moistening Co., Boston, Mass., including Knowles triplex 4 x 4 power pump, tank, and 20 moistening heads.
- One Complete Sprinkler System for fire protection, using the Grinnell glass button heads.
- One Bullock 75 K. W. Direct Current Multipolar Compound Generator, wound for 220 volts, over compounded 20 volts from no load to full load and direct connected to the Payne engine.
- One Bullock 30 K. W. Generator of the same type, direct connected to the Nash gas engine. The switchboard is arranged so that either unit may be thrown in independently on the power or lighting feeders or the two machines may be run in parallel. The lighting circuits are on the two wire 220 volt system and supply the equivalent of 660-16 candle power lamps. The power circuits are on the same system and supply approximately 160 H. P. in motors.
- Three 24 H. P. Bullock Motors.
- One 20 H. P. General Electric Motor.
- Two 7 1-2 H. P. General Electric Motors.
- Four 15 H. P. Bullock Motors.
- One 3 H. P. Motor, New England Motor Co.
- One 2 H. P. Motor, Holtzer-Cabot Electric Co.
- One 4 H. P. G. E. Electric Dynamometer which may be used as a double current generator or rotary transformer receiving direct current at 220 volts and delivering three phase alternating current which by a step-up transformer will give 220 volts at 60 cycles.
- One 250 volt Weston Portable Voltmeter.
- One 250 volt Weston Portable Voltmeter with calibrating coil.
- One 150 ampere Weston Portable Ammeter.
- One Weston Portable Millivoltmeter with 200 milli-volt and 20 milli-volt scales.
- One 2 ampere and one 20 ampere shunt for use with above instrument as an ammeter.
- One D'Arsonval Reflecting Galvanometer.
- One Simple Galvanometer.
- One Wheatstone Bridge.
- Two Direct Current Self Feeding Arc Lamps.
- Two Hand Feed Arc Lamps for stereopticons.
- Resistance boxes of various sizes and other apparatus necessary for commercial testing of lamps, motors, etc.



KITSON HALL

ATHLETIC FIELD

SOUTHWICK HALL

An Exhibition Board containing samples of the Chloride and Exide Storage Battery Plates donated by the Electric Storage Battery Co. of Philadelphia.

One Buff and Buff Surveyor's Transit.

One Philadelphia Level Rod.

One Fountain Mercury Barometer.

All of the above apparatus is available for experimental work and affords opportunities for laboratory practice for the classes in mechanical One Fortin Mercury Barometer.

### **Athletic Field**

Through the generosity of Mr. Frederick Fanning Ayer, the school has been provided with a Campus and Athletic Field of about three acres. This has been carefully graded and laid out for base ball, foot ball and track athletics. Bleachers have been provided which are used for either the out-of-door games or for basket ball played in a hall specially equipped for this game.

In the basement of Kitson Hall there has been provided a recreation room for the use of the students at such times as their attendance is not required in classes. This room is also used by those who take part in athletics, and connected to it is a smaller room provided with shower baths, lockers and toilets. Both rooms are easily accessible to the Campus by way of the outer door of Kitson Hall.

The athletic interest is growing yearly and receives the encouragement of the management.





FINISHING DEPARTMENT



# DAY CLASSES

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## Entrance Qualifications

Candidates for admission are accepted upon presentation of properly vouched certificate showing the completion of a regular four year High School course. For all others, there are held examinations, as stated in calendar; candidates failing to pass at June examinations are allowed to try again in September; those who cannot attend the June examinations, may present themselves in September; if conditioned, a further examination will be appointed. Examinations cover in general the following subjects:

### Arithmetic

Definitions; elementary, operations in addition, subtraction, multiplication and division; squares; cubes; square root; interest, discount; fractions, simple and complex; decimals; percentage, alligation; ratio and proportion. Metric System.

### English

The candidates are expected to correct samples of bad English, for spelling, punctuation, capitalization, grammar and sense; also to write a short composition on a given familiar theme.

*Commencing with June 1908, applicants for admission must show familiarity with the following books:*

*Shakespeare's The Merchant of Venice; Sir Roger de Coverley Papers in the Spectator; Irving's Life of Goldsmith; Coleridge's The Ancient Mariner; Scott's Ivanhoe and Lowell's The Vision of Sir Launfal; George Eliot's Silas Marner; Burke's Speech on Conciliation with America.*

*Subjects for the theme will be taken from the above mentioned books and the candidate will be expected to answer questions concerning the lives of the authors and principal historical events associated with the books. The composition will be judged from its correctness in spelling, punctuation, grammar, idiom and paragraphing. The student will be judged by how well he writes rather than how much he writes.*

### Geography

Location of principal countries, with capitals, large rivers, mountains, etc., noting characteristics of climate, productions and inhabitants. General statements rather than specialization are sought.



MECHANICAL DRAWING ROOM

## **American History**

*Beginning with June 1908, applicants for admission must show proficiency in American History covering the period from the settlements of the Thirteen Colonies to the present time. Johnston's High School History of the United States will serve in securing a satisfactory preparation.*

## **Algebra**

Fundamental operations, parenthesis, factoring; highest common factor; least common multiple; fractions, simple and complex; simple equations, one or more unknown quantities; radicals; involution and evolution; square and cube root; logarithms; ratio and proportion; exponents, including fractional and negative.

## **Plane Geometry**

As much plane geometry as is included in any of the generally accepted text books. The student should be familiar with properties of plane rectilinear figures, the measurement of angles, the circle, polygons, etc.; applications to the measurement of lines and plane figures.

## **Preparation**

Particular stress is laid upon a thorough grounding in mathematics including Algebra, Arithmetic and Plane Geometry, as these form the basis upon which the work of this school rests. A preliminary course in science, including Physics and Chemistry serve to prepare the student's mind for the higher branches of these subjects and their application.

## **Advanced Standing**

Candidates who may have received previous training in any of the subjects ordinarily taken in the regular course may present themselves for examination as per calendar. If a satisfactory rank be attained, they will be given such further work as will be best suited to their advancement.

## **Attendance Card**

At the beginning of each term all students must fill out and file with the Principal on blank forms which are provided, a formal application for such subjects as he may choose, subject to the approval of the Principal. When an attendance card is once approved, no change can be made except through the Principal.

## **Application Blanks**

A blank form of application may be found at the end of this bulletin. This should be properly filled out by all applicants.



MECHANICAL ENGINEERING CLASS ROOM

## Fees

The fee for the day course is \$100 per year for residents of Massachusetts, with the exception of the Chemistry and Dyeing Course, for which the fee is \$125. This applies only to students entering in September, 1907. For non-residents the fee for all courses is \$150 per year.

Three-fifths of the fee is charged for a single term and is payable on or before October 10, the balance on or before February 10, of each year. After payment is made, no fee or part thereof can be returned, except by special action of the Trustees.

Special students pay, in general, the full fee, but if a course be taken involving attendance at the school during a limited time, application may be made to the Principal for a reduction.

Students must provide their own books, stationery, tools, etc., and pay for any breakage or damage that they cause. The above fee includes free admission to any of the evening classes in which there is accommodation, should any day student desire to attend.

For all first year students a minimum deposit of \$20 is required to cover the cost of breakage in the chemical laboratory, the unexpended balance to be returned to the student at the end of the year.

For all students in second or third year taking Chemistry or Dyeing Laboratories a deposit of \$15 per term is required. The unexpended balance will be returned at end of year.

The fees for the evening classes are indicated under Evening Classes which see page 27.

Fees are strictly payable in advance, and students whose fees remain unpaid after the above mentioned dates will not be admitted to classes.

## Aid to Students

Free scholarships have not been provided for but provision will be made for applicants for the day courses who have the qualifications for matriculation and are properly vouched for, who furnish satisfactory evidence that they are unable at entrance to meet the charges in whole or in part for tuition.

## Examinations

Examinations are held at the end of each term.

In general, the examinations cover the work of the preceding term, but at the end of the third year, candidates for diplomas may be examined on all of the preceding three years' work.

Examinations for students conditioned in first term subjects are held in May and examinations for students conditioned in the Final Examinations are held in September following.

If a student fails to clear a condition he may be required to repeat or drop the subject; and he cannot be admitted to subjects dependent thereon.





BOILER ROOM



Intermediate examinations are held every five weeks and these serve to inform the student as to the progress made.

Daily work and regularity of attendance are considered in making up the reports of standing.

Continued or persistent absence (or tardiness) from the classes is considered reason to exclude a student from the class.

### **Reports of Standing**

Twice during each term informal reports are sent to students, or to guardians of such as are not of age; and at the end of each term formal reports are made.

### **Thesis**

All candidates for the diploma of the school must file with the Principal not later than May 15, a report of original investigation, or research, written on a good quality of paper, 8x10 inches, with one inch margin at left, and 1-2 inch at right of each page; such thesis to have been previously approved by the head of the department in which it is made.

### **Graduate Course**

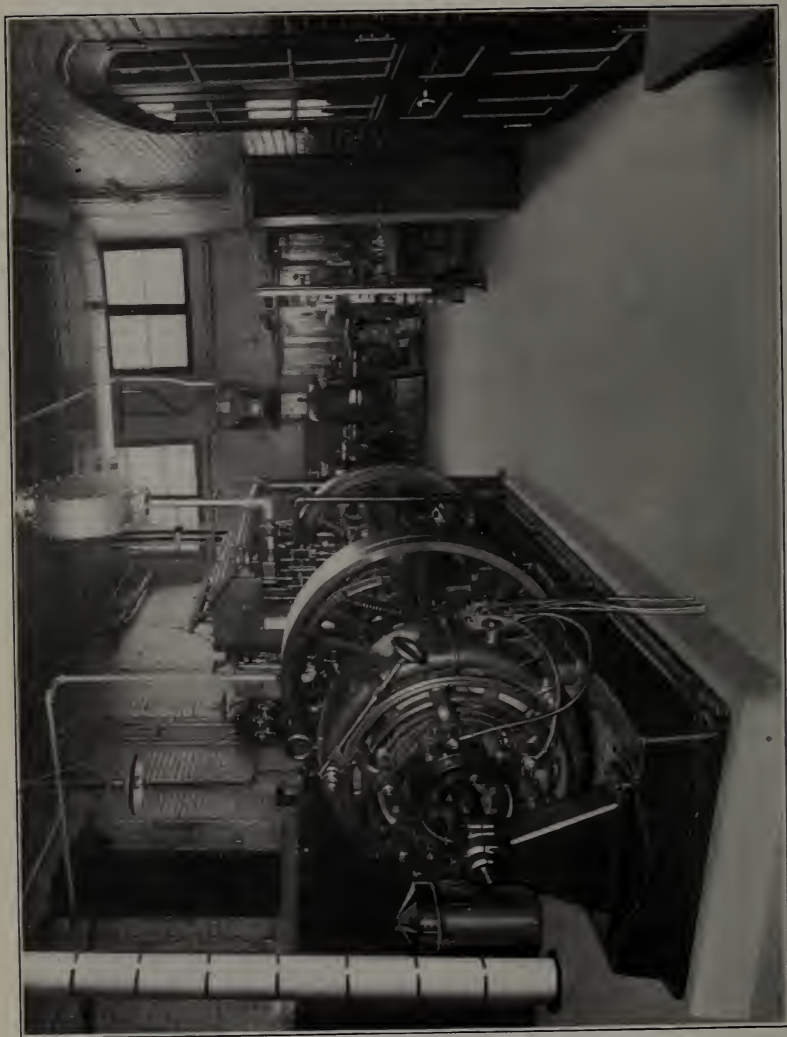
Graduates of technical courses of other schools are invited to communicate with the Principal with reference to special courses in the textile studies. Previous training in the engineering branches will usually reduce materially the time necessary to complete any of the courses at this school. The advantages offered to such persons for special research work are unexcelled, and a most profitable course may be arranged.

### **The Regular Courses**

The title of each of the regular courses is an indication of the particular nature of the course, unless it be in the case of Course III. There is a considerable demand for a general textile course in which the whole subject may be treated broadly; this course is organized with this particular object in view, although various options are offered, in which some one branch may be followed at length. Certain general studies are included in each course, in order that in specializing, a too narrow view may be avoided.

### **Special Courses**

While it is always urged that regular courses be followed if possible, there is opportunity to make special arrangements to fit for particular positions, as for example:—yarn mill, weaving special fabrics, designing, etc., and owing to the large number of possibilities, those desiring such courses are invited to correspond with the Principal.



GAS ENGINE UNIT  
ENGINE ROOM

### Diploma

The diploma of the School is awarded upon the satisfactory completion of any one of the regular courses, covering not less than three years, except where entrance is to advanced standing. In such cases at least one year's attendance is required.

### Medal of Honor

The New England Cotton Manufacturers' Association offers annually a medal to that member of the graduating class from the Cotton Manufacturing course, selected because of his standing and general ability, as best fitted to receive it.

### Special Awards of Merit

The following prizes have been offered by a friend of the School:

First:—Ten dollars to the regular student in either the Second or Third Year class who shall write the best article upon one of five specified subjects to be selected by the Faculty.

Second:—Ten dollars to the student taking any regular course in the school, who shall be considered as having attained the highest scholarship in First Year Chemistry.

Third:—Ten dollars to the student taking any regular course, other than the Chemistry and Dyeing courses, who shall be considered as having attained the highest scholarship in the Second Year Textile Chemistry and Dyeing.

Fourth:—Ten dollars to the regular student of the Chemistry and Dyeing course who shall be considered as having obtained the highest scholarship during his Second Year.

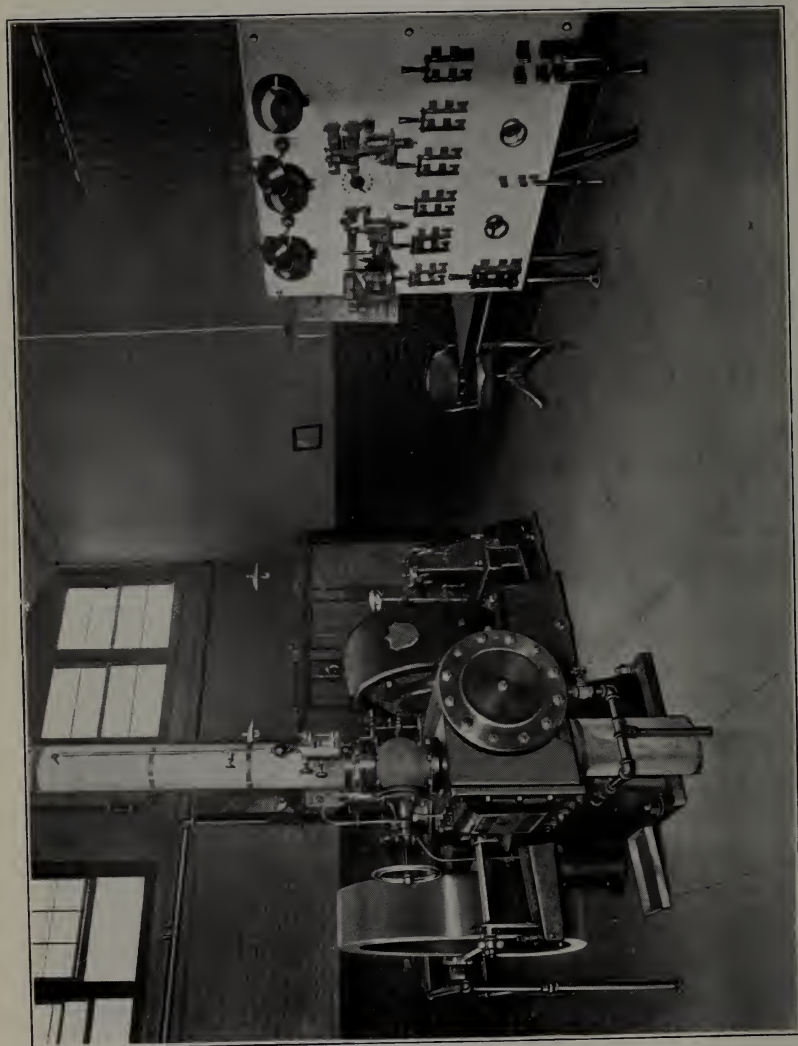
Fifth:—Twenty dollars to the regular student in Chemistry and Dyeing course who shall present the best Thesis at his graduation.

The above sums to be invested in books and the awards to be made each June by such persons as the faculty of the school shall designate. In case no one is considered as being worthy of any particular scholarship, the same may be withheld and added proportionately to the scholarships awarded.

These awards to be made in June, 1906, and 1907.

### Conduct

Day students are expected to attend all lectures, classes and demonstrations of practical work, except when permission to be absent has been obtained from the Principal. In cases of sickness or other unavoidable absence, written explanation must be sent to the Principal. The daily work of the student forms an important part of his record, and no student will be awarded the diploma unless this portion of his record is clear.



STEAM ENGINE UNIT  
ENGINE ROOM

Books are prescribed for study, for entry of lecture notes and other exercises, and are periodically examined by the lecturers. The care and accuracy with which these books are kept are considered in determining standing.

Students are required to return to the proper place all instruments or apparatus used in experimental work and to leave all machinery and apparatus with which they may experiment clean and in working order. All breakages, accidents, or irregularities of any kind must be reported immediately to the head of the department, or instructor in charge.

In cases of either day or evening students, irregular attendance, lack of punctuality, neglect of either school or home work, disorderly or ungentlemanly conduct or general insubordination, are considered good and sufficient reason for the immediate suspension of a student, and a report to the Trustees for such action as it deems necessary to take.

It is the aim of the Trustees so to administer the discipline of the school as to maintain a high standard of integrity and a scrupulous regard for trust. The attempt of any student to present as his own, work which he has not performed, or to pass any examination by improper means, is regarded by the Trustees as a most serious offense and renders the offender liable to immediate suspension or expulsion. The aiding or abetting of a student in any dishonesty is also held to be a grave breach of discipline.

Any student who violates these provisions will be immediately suspended by the Principal and the case reported at the following meeting of the Trustees for action.

Young men abounding in vitality when suddenly cut loose from home and established social environment to acquire an education at a residential school need especially the careful direction of more mature minds in the formation of new associations. The managements of all residential schools are aware that this fact is the cause of considerable anxiety on the part of parents and guardians. The responsibility thus placed upon those under whose care these pupils are committed is profoundly recognized.

The public schools are for boys and girls, the college for youth, the higher technical and professional schools of medicine, law, engineering, etc., are for men. It is now fully recognized that the fundamental idea of the general educational system, from the kindergarten to the college inclusive, should be the development and establishment of character, and it is therefore expected that those entering the technical schools will have made some progress in self-respect, self-denial and self-control. They enter substantially upon their life work when they matriculate at the higher technical schools and may be placed in their honor as to conduct and not be subject to an irritating and humiliating system of espionage outside of school hours.

In place of such espionage it is the policy of technical schools to rely mainly upon the discipline of the work of the course in connection with ample facilities for physical exercise in the various athletic games and sports, for which ample provision has been made at this school.



Pupils often err in conduct from thoughtlessness and lack of experience rather than through wilfulness, and unconsciously fall into habits because of the lack of intelligent warning and instruction. For this reason, during the coming year it is proposed to give thorough instruction by lectures, covering the subjects of hygiene, the preservation of physical vigor, morals, thrift, the duties of citizenship, etc. A careful scrutiny will also be maintained by the instruction staff in order to detect in the students any tendency of relaxation in the work or attendance, and all reasonable effort will be made to maintain a high standard of scholarship and morals.

### **Library**

The School Library is supplied with leading textile books and with works dealing with science, art or industries allied to the textile trades. The leading textile papers are kept on file.

### **Sessions**

The regular school sessions are in general from 8.30 a. m. to 12.30 p. m., and from 2 to 4.30 p. m., except Saturdays, when the buildings are closed in the afternoon.

A tabular view designates the hours at which the various classes meet. This is rigidly adhered to and the student is marked for his attendance and work as therewith scheduled.

### **General**

Students from a distance, requiring rooms and board in the city, may, if they desire it, select the same from a list which is kept at the School. The cost of rooms and board in a good district is from \$6 per week upwards.

All raw stock and yarn provided by the School, and all the productions of the School remain, or become, the property of the Trustees, except by special arrangement, but each student is allowed to retain specimens of yarn or fabrics that he has produced, if mounted and tabulated in accordance with the requirements of the school. It is understood that the Trustees may retain in the School such specimens of student's work as they may determine.

Apparatus used in the Dyeing or Chemical Laboratory is provided by the School, but a deposit must be made by the student at the beginning of the term sufficient to cover its cost, and this deposit will be returned to him at the close of the term, subject to such deduction as will reimburse the School for broken or damaged articles and material used.

An additional entrance examination to suit the convenience of students from a distance (out of New England), will be arranged.

Lockers are provided for the use of students, sufficiently capacious to contain clothing, books and tools. A deposit of 25 cents is required, which will be returned to the student upon surrender of the locker key.



No books, instruments, or other property of the School are loaned to the students, to be removed from the premises except by special permission.

### Materials

Students must purchase such tools, instruments, text books, and apparatus as may from time to time be recommended by the head of each department, and the cost of these for day students is from \$15 to \$20, and for evening students from \$1 upwards according to the subject studied.

### Awards

Gold Medal, Paris Exposition, 1900, for general excellence. A special Medal, Merchants and Manufacturers Exposition, Boston, 1900. The Pan American Medal awarded to the School, 1901. Gold Medal, Louisiana Purchase Exposition, 1904, Gold Medal, Lewis and Clark Centennial Exposition, 1905.

### Bulletins and Catalogue

All students registering and paying the regular fee for the course selected are entitled to the Bulletins and Catalogues when issued.

A special bulletin descriptive of the Chemistry and Dyeing Course has been prepared and may be obtained upon application.

## COURSES OF INSTRUCTION

In the column headed "Hours of Exercise" the numbers represent for each particular subject the total hours required for a period of fifteen weeks.

For detail description of the subjects taught see pages 95-106.

### FIRST YEAR

#### FIRST TERM

*(Common to all courses)*

	Hours of Exercise
Elements of Mechanism	60
Mechanical Drawing	112
Mathematics,—Algebra	30
Hand Loom Weaving and Elements of Design	55
General Chemistry	187
Freehand Drawing	}
Decorative Art	
English	15
German or Spanish	20

## COURSE 1. — COTTON MANUFACTURING

The Cotton Manufacturing Course is designed for students contemplating a career in the manufacturing of cotton yarns and cloths or allied industries.

During the first term of the first year, the studies are common to all courses and include instruction in elementary mechanism, mathematics, mechanical drawing, general chemistry and decorative art. Laboratory work supplements the lectures in chemistry and hand loom weaving assists in illustrating the principles of textile design.

The work in the Cotton Yarn Department comprises instruction in all the processes from the bale to the finished yarn. The instruction consists of lectures upon the machines and processes, and laboratory work upon the machines themselves. In the laboratory each student is required to make exhaustive tests upon each machine and all the settings and adjustments possible. The third year's work in this department is largely devoted to lectures upon the manufacture of specialties, waste products, etc., and special laboratory work, special tests upon yarns and fabrics, mill planning with regard to the arrangement of machinery and other work of an advanced nature.

The course in chemistry consists of lecture and laboratory work on inorganic chemistry followed by instruction in textile chemistry and dyeing, including a short course in the dyeing laboratory.

The work in mechanism is followed by steam engineering, electricity, hydraulics and mill engineering. The mechanical drawing taken in connection with these subjects augments this instruction as well as provides opportunity for students to become skilled in draughting.

The course in designing, cloth analysis, and cloth construction includes lectures on plain and fancy weaves and Jacquard work, the analysis of all commercial fabrics, and designs for the same. During the third year of this course students in this department specialize on cotton fabrics.

Power weaving is taken up during the second and third years. Commencing with lectures and practice upon plain looms, the student is taken through dobby and box-loom weaving to Jacquards.

A course in knitting taken during the third year includes the manufacture of hosiery and underwear. There is also a course of lectures on the finishing of cotton fabrics.

For detail description of the subjects see page 82.

## COURSE I.—COTTON MANUFACTURING

### FIRST YEAR

(*For First Term see page 71*)

#### SECOND TERM

	Hours of Exercise		Hours of Exercise
Cotton Manipulation	120	Textile Chemistry	15
Textile Design, Cloth Analysis	60	Freehand Drawing and Decorative Art	30
Hand Loom Weaving	55	Mechanical Drawing	75
Elements of Mechanism	60	Language (German or Spanish)	20
Trigonometry	30	English	15
General Chemistry	30		

### SECOND YEAR

#### FIRST TERM

Cotton Spinning	240	Mechanical Engineering	30
Textile Design, Cloth Analysis	60	Power Loom Weaving	45
Textile Chemistry and Dyeing	30	Physics	30
Machine Drawing	40	Electrical Engineering	30

#### SECOND TERM

Cotton Spinning	142	Electrical Engineering	30
Textile Design, Cloth Analysis	60	Power Loom Weaving	97
Textile Chemistry and Dyeing	97	Machine Drawing	40
Mechanical Engineering	30	Physics	30

### THIRD YEAR

#### FIRST TERM

Cotton Spinning	225	Knitting Machinery	45
Textile Design	30	Power Loom Weaving	135
Cloth Analysis	60	Mill Engineering	30

#### SECOND TERM

Cotton Spinning	180	Mill Engineering	45
Textile Design, Cloth Analysis	60	Knitting Machinery	45
Power Loom Weaving	142	Physical Laboratory	30
Thesis			

## COURSE II.—WOOL MANUFACTURING

The course of Wool Manufacturing is arranged for those who contemplate a career in the manufacture of woollen or worsted fabrics. It includes instruction in all of the varied processes employed in adapting the wool fibre to cloth, namely,—sorting, scouring, carding, combing, spinning, designing, weaving, dyeing and finishing. The work is carried on by lectures, recitations and practical work in the laboratories.

Following the first term, which is common to all courses, the student in his second term commences work in the Woollen and Worsted Laboratory, and through systematic steps is acquainted with the machines employed in the first steps of yarn manufacturing. At the same time lectures are given upon the many kinds of wool, variation in quality, grades, uses, etc., as influenced by the locality where grown. This is followed by practical work on the sorting table.

The second and third years cover spinning of both woollen and worsted yarn by the Bradford and French systems, also the manufacture of tops, including combing, gilling and back washing. Scouring and carbonizing are taken up in detail by lectures and by practical work.

The general chemistry of the first year leads to organic chemistry, followed by textile chemistry and dyeing in the second year. This includes a short course in the Dyeing Laboratory.

Textile designing, cloth analysis and construction are continued from the first year throughout the course, the work being applied especially to woollen and worsted goods. Weaving on power looms commences in the second year and continues through the third.

Lectures on finishing commence with the third year and are augmented by extensive practice with the machines in the Finishing Department.

Work in the Mechanical Department extends throughout all three years and includes mechanical drawing, properties of saturated steam, electricity and hydraulics. The practical application of the principles studied in these subjects is brought out forcibly in the work on mill engineering, where mill design and construction are considered. A short course covering methods employed in the testing of fibres, yarns and cloths, together with laboratory work in the manipulation of certain physical apparatus, is given in the second and third years.

For detail description of the subjects see page 87.

## COURSE II.—WOOL MANUFACTURING

### FIRST YEAR

(*For First Term see page 71*)

#### SECOND TERM

	Hours of Exercise		Hours of Exercise
Woolen Carding and Spinning	120	Textile Chemistry	15
Textile Design, Cloth Analysis	60	Freehand Drawing and Decorative Art	30
Hand Loom Weaving	55	Mechanical Drawing	75
Elements of Mechanism	60	Language (German or Spanish)	20
Trigonometry	30	English	15
General Chemistry	30		

### SECOND YEAR

#### FIRST TERM

Wool Sorting, Scouring and Spinning	240	Mechanical Engineering	30
Textile Design, Cloth Analysis	60	Power Loom Weaving	45
Textile Chemistry and Dyeing	30	Physics	30
Machine Drawing	40	Electrical Engineering	30

#### SECOND TERM

Wool Sorting	142	Electrical Engineering	30
Worsted Spinning		Power Loom Weaving	97
Textile Design, Cloth Analysis	60	Machine Drawing	40
Textile Chemistry and Dyeing	97	Physics	30
Mechanical Engineering	30		

### THIRD YEAR

#### FIRST TERM

Wool Sorting	195	Power Loom Weaving	135
Worsted Spinning		Finishing	45
Textile Design	30	Mill Engineering	30
Cloth Analysis	60		

#### SECOND TERM

Wool Sorting	180	Power Loom Weaving	142
Worsted Spinning		Finishing	75
Textile Design, Cloth Analysis	60	Mill Engineering	45
Thesis		Physical Laboratory	30

### COURSE III. — TEXTILE DESIGN

The general course in Textile Design is planned to meet the demand of young men for a technical training in the general processes of textile manufacturing, but with particular reference to the design and construction of fabrics. To this end a foundation is laid in the first year by instruction in mechanics, mechanical drawing, mathematics, chemistry and the elementary principles of designing and weaving. Two options are offered, namely, Cotton or Woolen and Worsted Spinning, and at the commencement of the second term the student should make his selection. At this time he begins his work in the yarn departments and pursues it until the end of the second year. The course in the yarn department is similar to that pursued by either Course I or II students, but is not carried to the same extent.

Throughout his entire course he receives instruction in design, cloth analysis and construction of all the standard cloths, viz.—trouserings, coatings, suitings, blankets, velvets, corduroys, plushes, etc. This leads into advanced work in Jacquard designing, being supplemented by work in the studio of the Decorative Art Department.

The course in chemistry leads to textile chemistry and dyeing in the second year and includes a short course in the dyeing laboratory.

Power weaving commences with the second year and continues throughout the course.

The instruction in the Mechanical Department is carried along parallel with the other subjects of the course and includes steam, electricity and hydraulics. In the third year mill engineering is taken up and serves to show the application of the principles studied in the previous years. Mechanical drawing extends throughout all three years and finds extensive application in the machine departments.

For detail description of the subjects, see page 91.



## COURSE III.—TEXTILE DESIGN

### FIRST YEAR

(*For First Term see page 71*)

#### SECOND TERM

	Hours of Exercise		Hours of Exercise
Textile Design, Cloth Analysis	60	Trigonometry	30
Hand Loom Weaving	55	Textile Chemistry	15
Elements of Mechanism	60	Mechanical Drawing	75
General Chemistry	30	Cotton or Woolen Spinning	120
Freehand Drawing and Decorative Art	30	Language (German or Spanish)	20
		English	15

### SECOND YEAR

#### FIRST TERM

Textile Design, Cloth Analysis	60	Power Loom Weaving	45
Machine Drawing	40	Cotton or Woolen Spinning	240
Textile Chemistry and Dyeing	30	Physics	30
Mechanical Engineering	30	Electrical Engineering	30

#### SECOND TERM

Textile Design, Cloth Analysis	60	Electrical Engineering	30
Steam Engineering, Hydraulics, Physical Measurements	30	Machine Drawing	40
Textile Chemistry and Dyeing	97	Power Loom Weaving	97
		Physics	30

### THIRD YEAR

#### FIRST TERM

Textile Design, Cloth Analysis	60	Mill Engineering	30
Hand Loom Weaving	30	Finishing	45
Power Loom Weaving	135	Decorative Art	40

#### SECOND TERM

Textile Design, Cloth Analysis	60	Mill Engineering	45
Power Loom Weaving	142	Finishing	90
Decorative Art	60	Physical Laboratory	30
Thesis			

#### COURSE IV.—CHEMISTRY AND DYEING

The regular course in Chemistry and Dyeing extends through three entire school years, and is especially recommended to those who intend to enter upon any branch of textile coloring, bleaching, or the manufacture or sale of the various dyestuffs and chemicals used in the textile industry. The theory and practice of all branches of dyeing, printing, bleaching, scouring, etc., are taught by lecture work supplemented with a large amount of laboratory work.

During the first year general chemistry, including both inorganic and organic, is taught by lectures and laboratory work, and this is supplemented during the second term by qualitative analysis and stoichiometry. The lectures upon textile chemistry also begin during the first year.

Advanced inorganic as well as advanced organic chemistry are studied throughout the second year as a continuation of the elementary chemistry of the first year, but the majority of the time is spent upon quantitative analysis, industrial chemistry and textile chemistry and dyeing.

The third year is devoted to advanced textile chemistry and dyeing, dye testing, dye matching, woolen and worsted finishing, calico printing and cotton finishing, quantitative analysis, industrial chemistry, physical chemistry and thesis work.

The work is taken up in a thorough manner and has been so arranged that the amount of time spent in the laboratories and in class-room work balance each other. Sufficient studies are taken in the other departments to broaden the knowledge of the student in regard to textile work in general, and he is given such training as the time will permit in mathematics, mechanics, mechanical drawing, modern languages and designing.

The student who conscientiously performs all of the prescribed laboratory work and the practice work should be proficient not only in dyeing and textile printing, but should be well trained in the methods of analysis and the testing of the various chemicals, mordants and dyestuffs so extensively used in the textile industry.

For detail description of the subjects see page 95.

# COURSE IV.—CHEMISTRY AND DYEING

## FIRST YEAR

(For First Term see page 71)

### SECOND TERM

	Hours of Exercise		Hours of Exercise
Elementary Organic Chemistry	30	Elements of Mechanism	60
Textile Chemistry	15	Mathematics	30
Stoichiometry	30	Mechanical Drawing	30
Qualitative Analysis	195	Decorative Art	15
Cloth Analysis	30	German	20
		English	15

## SECOND YEAR

### FIRST TERM

Advanced Organic Chemistry	15	Advanced Mechanics	30
Advanced Inorganic Chemistry	30	Quantitative Analysis	112
Industrial Chemistry	120	Power Loom Weaving	30
Textile Chemistry and Dyeing	30	Physics	30
Dyeing Laboratory	150		

### SECOND TERM

Advanced Organic Chemistry	30	Advanced Mechanics	30
Advanced Inorganic Chemistry	30	Dyeing Laboratory	210
Textile Chemistry and Dyeing	30	Physics	30
Quantitative Analysis	150		

### OPTIONS

Designing	Advanced Mathematics
Power Loom Weaving	

## THIRD YEAR

### FIRST TERM

Industrial Chemistry	68	Physical Chemistry	30
Advanced Textile Chemistry and Dyeing	30	Quantitative Analysis	135
Dyeing Laboratory	157	Finishing	45

### SECOND TERM

Industrial Chemistry	30	Quantitative Analysis	98
Physical Chemistry	20	Woolen and Worsted Finishing	45
Advanced Textile Chemistry and Dyeing	20	Calico Printing and Cotton Finishing	60
Dye Testing and Color Matching	60	Thesis	150

## COURSE VI.—TEXTILE ENGINEERING

The course in Textile Engineering is designed to equip the student to meet intelligently the engineering problems of the textile industry as well as to provide him with a knowledge of the processes and machines of its varied branches. The wide scope of this field provides abundant applications of the broad fundamental principles underlying all engineering work. The student is thoroughly grounded in these principles before attacking the more advanced and specialized problems.

The most important of the preliminary subjects are mathematics, physics, the elements of mechanics, mechanism and drawing. In addition to the prescribed courses in mechanics and drawing taken by all regular students, many of the advanced problems in applied mechanism are studied in detail both in the drawing room and laboratories. The work in physics is given with special reference to such problems as the physical testing of fibres, yarns and fabrics, hygrometry, etc.

A large amount of time is also spent in the drawing room and the practical uses of mechanical drawing are considered of first importance. Courses are also given in the elements of steam, electrical and hydraulic engineering, not with the aim of giving exhaustive instruction in the subject but rather to familiarize the student with the means, methods and results available in the modern practice of these branches. In connection with this work, the power plant of the school is available for boiler and engine testing as well as a variety of other experimental work.

The work in mill engineering covers a wide range of subjects, including mill construction with calculations and drawings, mill heating, lighting, fire protection and humidifying. Special importance is also attached to the arrangement of plants and machinery for economical production and the modern methods of generation, distribution and measurement of power. The data for all problems in this work are taken from actual conditions and the solutions are compared with those of some of our best known mill engineers.

Advanced mathematics and physics are required in all three years, and the instruction is supplemented with laboratory exercises that skill may be acquired in the manipulation of physical apparatus.

## COURSE VI.—TEXTILE ENGINEERING

### FIRST YEAR

*(For First Term see page 71)*

#### SECOND TERM

	Hours of Exercise		Hours of Exercise
Trigonometry	30	Textile Chemistry	45
Machine Drawing	105	Designing (Elements)	60
Physics	30	Cotton Laboratory	105
Freehand Drawing	30	German	20
Elements of Mechanism	60	Advanced Mechanism	15

### SECOND YEAR

#### FIRST TERM

Advanced Mechanism	15	Mechanical Laboratory	45
Analytical Geometry	30	Electricity	30
Machine Drawing	75	Cotton Laboratory	60
Steam Engineering	30	Physics	30
Power Loom Weaving	45		

#### SECOND TERM

Analytical Geometry	30	Mechanical Laboratory	60
Machine Drawing	75	Electricity	30
Steam and Hydraulics	45	Wool Laboratory	90
Physical Laboratory	45	Applied Mechanics	15
Power Loom Weaving	60	Physics	30

### THIRD YEAR

#### FIRST TERM

Wool Laboratory	120	Mill Engineering	45
Differential, Integral Calculus	30	Power Plants	30
Mill Engineering Drawing	90	Applied Electricity	30
Physical Laboratory	45		

#### SECOND TERM

Wool Laboratory	120	Mill Engineering Drawing	90
Differential, Integral Calculus	30	Physical Laboratory	45
Mill Engineering	45	Power Plants	30
		Thesis	

# OUTLINE OF INSTRUCTION

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## COTTON DEPARTMENT

### *Cotton Fiber*

- Ancient History
- Development of Cotton Spinning Machinery.
- Botanical Varieties—Their Classification and Characteristics.
- Commercial Varieties—Classifications, Characteristics and Adaptatives.
- Microscopical Examination of Various Cottons.
- Points Considered in Judging Cotton,—Dampness, Color, Uniformity, etc.
- Grading and Stapling—American, Egyptian and Sea Island Cottons.
- Methods of Cultivation and Marketing.
- Ginning—Construction, Operation and Advantages of Saw and Roller Gins.
- Baling,—Various forms of Baling Presses and their Products, Characteristics of each.
- Mixing,—Object and Methods of Mixing for Per cent., Grade, Variety and Color Mixtures.
- Classification of the Processes of Yarn Manufacture.

### *Opening and Picking*

- Construction and Operation of various machines used in opening and picking cotton, Hopper Bale Breaker, Opener, Automatic Feeder, Breaker, Intermediate and Finisher Pickers, Waste Openers and Cleaning Machines.
- Details of Construction,—Cleaning Trunks, Evener Motions, Types of Beaters, Grids and Screens, Lap Measuring Motion, Safety Stop Motion.
- Details of Operation,—Regulation of the Air Current, Character and Regulation of the Waste, Drafts of Intermediate and Finisher.
- Adjustment of Feeder, Grid Bars, Lap Racks and Feed Rolls.
- Causes of and Remedies for,—Uneven laps, Split laps, Ragged selvedges, Dirty laps, etc.
- Cleaning and Oiling.



## *Carding*

- Object and Principles of Carding.
- Construction and Operation of Revolving Flat, Wellman, Foss & Peevey and Roller and Clearer Cards.
- Details of Construction,—Feed Plate and Roll, Screens, Flats, Doffer, Combs, Coiler, Mote-knife, etc.
- Card Clothing,—Various forms of Foundation, Wire, Method of Setting, Number of Points per square foot, Shape and Size of Wire, Methods of Grinding, Method of Cutting Tape and Clothing Cylinder, Doffer and Flats.
- Details of Operation,—Method of driving various parts, Striping, Grinding and Burnishing, Setting of various parts, Draft, Speeds and Production, Temperature and Humidity.
- Care of Carding Machinery, defects in quality of work and remedies for same.
- Character and Regulation of waste.
- Sample Carding by hand of at least twelve different blends.

## *Drawing*

- Theory of Drawing.
- Effect of the Doublings.
- Construction and Operation of the Drawing Frame.
- Details of Stop Motions, Mechanical and Electrical and advantages of each.
- Details of Drawing Rolls, Solid and Shell, Common and Metallic.
- Metallic Rolls,—Construction, Operation and Advantages.
- Roll Covering,—Materials used, Roller Cloth, Selection of leather for various kinds of work, Methods of applying leather covering.
- Roller Varnish,—Its object and methods of applying, recipes for same.
- Roll weighting for Common and Metallic Rolls.
- Setting of Drawing Rolls for Long and Short Staple, Heavy and Light Slivers, etc.
- Minor Details,—Clearers, Traverse Motion, Weight Relieving Motion, Trumpets and Condensing.
- Amount and proportioning of drafts and tension.
- Construction and Operation of Railway Head.
- Details of Evener Motion, Stop Motions, etc.
- Care of Drawing Machinery, Roller scouring, Cleaning and Oiling, Sizing of sliver, cut sliver and remedies for same.

## *Roving Processes*

- Reeling, Weighing and Numbering of Roving by English and Metric Systems.
- The Development of the Fly Frame.

Details of Construction of Slubber, Intermediate, Fine and Jack Fly Frames.  
 Details of the regulation of Draft, Twist, Lay and Tension on fly frames.  
 Amount of Twist for various cottons and methods of obtaining same.  
 Builder Motions,—English and American types and method of setting and adjusting.  
 Proportioning and amounts of draft and roller setting.  
 Creeling, Piecing, Doffing, Cleaning and Oiling.  
 Stop Motions,—Full bobbin, Safety stop, Back stop motion, Single Roving Stop Motion.  
 Details of Winding and the Regulation of the Tension.  
 Study of the Differential Motion and its work in the Fly Frame.  
 Study of the Functions and Development of the fly frame Cones.  
 Defects in adjustment and product of roving machinery and remedies for same.

### *Ring Spinning and Twisting*

Theory of Spinning.  
 Classification of yarns in regard to uses, Materials, Varieties and Twist.  
 Reeling, Weighing and Numbering of single and ply yarns.  
 Construction and Operation of the Ring Frame.  
 Consideration of Spinning details, thread guides, separators, traveller cleaners, warp and filling bobbins, space of spindles, drum and bands, roving traverse, etc.  
 Rolls and roll setting, weighting, single and double boss, amount and proportioning of draft for various yarns.  
 Twist and twist gearing, Amounts for warp, filling and hosiery yarns, ply yarns, etc.  
 Rings and Travellers, Kinds and methods of determining correct size for various yarns.  
 Comparison of Single and Double Roving in Spinning.  
 A Study of the development of the modern Spindle.  
 The Spinning Builder,—Study of the Warp Filling and Combination Builder Mechanisms.  
 Calculations for Speed, Draft, Twist, etc.  
 Methods of preparing yarn for Twisting.  
 The Spooler and Multiple Winder.  
 Operation of Ring and Flyer Twisters.  
 A Study of the Wet and Dry Twisting Processes.  
 Care of the rolls, spindles, bands, doffing.  
 Uneven, cut and cockled yarns and remedies for same.

### *Combing*

Object of Combing.

Kinds of cotton combed and classes of goods requiring combed yarns.

Preparing cotton for Combing, Drawing frame, Sliver lapper, Ribbon Machine.

Combinations of preparatory machines and details of operation.

A study of the Heilmann Comber and its operation, Feed Motion, Nippers, Cylinders, Detaching Mechanisms, Draw-box, Draft, Waste and Production, Single and Double Nip Machines.

Setting and Timing the Comber, Regulation of Waste and Production, Weight of lap, etc.

A Study of the Alsation Comber and its Operation.

A Study of Nasmith Comber and its Operation.

Care and management of Combing Machinery.

### *Mule Spinning*

A Comparison of Throstle, Ring and Mule Spinning and the Products of each Machine.

Advantages and Disadvantages of each machine.

Construction and Operation of the Self Acting Mule.

Details of Operation, Drawing and Twisting, Backing Off, Winding, Re-engaging.

Details of Construction, Builder Motion, Quadrant, Roller Motion, Nosing Motions, Jacking Motions, etc.

A Study of Building and Winding.

Calculation of Draft, Twist, Drag, Production.

Causes of and remedies for, Kinky yarn, Soft cops, Ridgy cops, Uneven chase, etc.

### *Organization*

Methods of handling Cotton Waste, Details of the manufacture of Cotton Wadding and other Waste Products.

Details of Fine Yarn Spinning, the manufacture of Sewing Thread, Lace Yarns, Twines and Cords.

The Manufacture of Fancy Yarns, Nub, Soop, Splash, Spiral Yarns, Flake Yarns, etc.

Factory Organization for various sizes and styles of yarns, Equipment, Programs, Balance of Production, Cost of Machinery, Power, etc.

The Economic Arrangement of Cotton Machinery.

Life of Cotton Machinery, Depreciation and Valuations.

Factory Cost Systems, Inventory, Productive and Non-Productive Labor, Supplies, Maintenance, General Expenses, etc.

## KNITTING DEPARTMENT

The course in Knitting is designed to meet the needs of those requiring special work in this branch, as well as those desiring only a general knowledge of the subject. The course begins with lectures upon the yarns used and the preliminary operations, and continues with the construction and operation of the various makes of knitting machines as applied to circular and flat knitting.

Beginning with the hand stocking frame, the student is given instruction upon the machines used for hosiery and the flat machines used in the manufacture of gloves, sweaters and jackets.

Following is a list of subjects taken up:

Knitting Yarns and Their Manufacture.

Operations preliminary to Knitting.

Winding—Cone Winding, The Payne Winder.

Development of Knitting.

Knitting Needles—Their Construction and Operation.

Latch Needles, Spring Needles.

Method of Producing Standard Stitches.

Study of the Plain Stitch and its Uses.

Study of the Rib Stitch and its Uses.

Study of the Tuck Stitch and its Uses.

Circular and Flat Knitting Machines.

Operations involved in the Manufacture of Seamless Hosiery.

Study of the Production of the Rib Top.

Details of Construction and Operation of the Circular Rib Knitting Machine, including a consideration of Stop Motions, Needle Cams, Pattern Wheels, Splicing Attachments, Measuring Devices, etc.

Transferring of Rib Tops.

Details of Construction and Operation of the Seamless Hosiery Machine, including a study of Stop Motions, Plaiting Attachments, Pattern Wheels and Chains, Shaping the Heel and Toe, Reinforcing the Heel and Toe, Loosening the Stitch for Reinforcing and Shaping, Semi, Three-quarter and Full Automatic Hosiery Machines.

Construction of the Looper and Study of its Operation, Regulation of Tension, etc.

Designing on Seamless Hosiery Machines,—Study of the Production of Fancy Stitches, Designing by Means of Colored Threads.

Sizes of Yarn for Various Work and Gauges.

Study of the Finishing of Hosiery,—Washing, Dyeing, Boarding, Mending, Pressing, Pairing, Stamping, etc.

Imperfections in Circular Knit Goods and Remedies for Same—Dropped Stitches, Curled Work, Ragged Edges, Stains, Streaked Work, etc.

A Study of the Flat Knitting Machines—The Lamb Principle as applied to Glove and Sweater Manufacture.

The Jacquard as applied to Flat Knitting Machinery.

*Raw Materials*

Animal Fibres:—Wool, Silk, Mohair, Alpaca, Vicuna, Cashmere, Camel Hair, etc.

Vegetable Fibres:—Cotton, Flax, Hemp, Jute, Ramie.

Wool Substitutes:—Noil, Shoddy, Mungo, Extracts.

Waste Products manufactured on Woollen Machinery:—Cotton Waste, Linters, Flax, Hemp, and Jute Waste.

Sources of supply and relative values of above.

Chemical and Physical properties and Composition.

Microscopical examination.

*Wool Fibre*

Physical and chemical structure—Differences between wool, hair and fur—

Physical properties, Strength, Elasticity, Curl, Lustre, etc.

Felting Property—Hygroscopic Property.

Structure and cause of Kemps.

Definitions of trade terms:—Picklock, XXX, XX, 1-2 Blood, 3-8 Blood, 1-4 Blood, Delaine, Braid, etc.

Pulled Wools—Their uses and classification.

*Wool Sorting*

Difference between Sorting and Grading—Sorting and Blending.

Judging Spinning Qualities.

Estimating Shrinkage.

Definitions of trade terms—Cots, Hog, Shurled Hogget, Wether, Fribs, Paint, Stain, Shoulder, Cast, etc.

*Wool Scouring*

Object of Wool Scouring.

Composition of Yolk and Suint.

Cholesterol and Lanolin.

Materials used as detergents.

Emulsion Process:—Use of Soda, Potash, Hard and Soft Soaps.

Manufacture of Scouring Soaps with tests for impurities.

Water in Wool Scouring with tests for hardness, etc.

Effect of heat on Wool Fibre with proper heat of scouring liquor.

Recovery of potash salts and wool fat from waste scouring liquor.

The Solvent process—Degreasing Wool, with Naphtha.

Construction and use of Scouring Machines and Rinse Boxes with Speeds, Adjustments and Productions.

Construction and use of Dryers, Table and Artificial.

Effect of heat on Lustre; proper heat for various classes of Wool:—(Braid, Botany, Mohair, etc.).

## *Carbonizing*

Object of Carbonizing.

Carbonizing Wool, Noils, Burr Waste, Rags, etc.

Carbonizing Agents:—Sulphuric Acid, Aluminum, Chloride, etc.  
Hydrometers.

Strength of Carbonizing Agents.

Carbonizing with Acid Gases.

Neutralizing.

## *Burr Picking*

Object of Burr Picking—What wools are Burr Picked and why they are not carbonized.

Construction and Use of the several Kinds of Burr Pickers.

Adjustments, Speeds and Production of same.

## *Mixing and Oiling*

Object of Mixing. Laying down lots.

Mixing Different colors of Wool.

Mixing Wool with Cotton, Shoddy, Noils, etc.

Object of Oiling—Discussion of various Kinds of Oils used, Olive, Lard, etc.

Oil Testing, Viscosity, Flashing Point, etc.

Manufacture of Emulsions.

Construction and Use of Automatic Oilers, Feeds and Pickers.

Speeds, Productions and Calculations for cost of Lots when materials of different values are used.

## *Carding*

Principles of Carding.

Functions of various parts:—Feed Rolls, Lickerins, Tumblers, Workers, Strippers, Cylinders, Fancies, Dickies, Doffers, etc.

Construction of various parts.

Direction of Revolution and Speeds.

Card Clothing—Construction and uses of the various Kinds of Backing: Leather, Flexifort, etc.—The several Kinds of Wire:—Garnett, Metallic, Convex, Lickerin, etc.

The "Counts and Crown" method of counting Card Clothing.

Card Adjusting and the use of Card Sets.

Clothing the Card.

Card Grinding and Grinders, Solid Roll, Traverse, Screw and Chain.

## *Woolen Cards*

Construction and use of the First Breaker, Second Breaker and Finisher.



Various methods of coupling Cards.

Card with Breast.

Woolen Card Feeds.—Object, Construction, and use of Automatic Feeds for First Breaker, Bramwell, etc.

The Construction and use of the several Kinds of Automatic Feeds for Second Breaker and Finisher, Apperly, Torrance Balling Head and Creel, Bates, Kemp, Scotch, etc.

Condensers, Rub Roll, Combination, Double Apron, etc.

Calculations for Proper Weight of Rovings, Speeds, Productions, etc.

SAMPLE CARDING.—Each student is required to make as least twenty

Sample Mixes combining different colors and grades of Stock and to Felt and Mount the same. Part of the Carding to be done by

Hand Cards and part on the Torrance Sample Mixing Card.

### *Woolen Mule*

Principles of Spinning. History and development.

Hand Jack, Self-operating and Self-acting Mules. The Mule-head.

Methods of Driving the various parts, Rolls, Spindles, Carriages, etc.

Backing-off. Winding Mechanism.

Study of the Quadrant and Builder-rail. Regulation of the Fallers.

Double Spinning. Twisting on Mule and on Woolen Twister.

With the above lectures will be given all the necessary calculations and actual practice on the various machines.

## **Worsted**

### *Top Making*

CARDING AND PREPARING—The principles of Worsted Carding—Types of Worsted Cards, Double Cylinder Lickerin, Breast, etc.

Speeds, Settings, Feeds, Adjustments, Productions.

PREPARING—Differences between Carding and Preparing—What Wools are Prepared and why they are not Carded. The use of Emulsions. A Set of Preparers. The calculations for Drafts on any Gill Box. The Clough Gill Box.

The proper Drafts in Preparing—Adjustments, Speeds, Productions, Calculations, etc.

GILLING AFTER CARDING—Number of Doublings, etc.

### *Combing*

The principles, history and development of Worsted Combing.

Combing on the Noble and Lister machines.

Calculations for Draft—Settings, Speeds, Productions, etc.

Per cents. of Noil.

GILLING AFTER COMBING—Proper Drafts and calculations for Doublings.

BACK WASHING—The object and nature of the process—Backwashing

Liquors, Composition, Heat, etc.

The Hygroscopic property of Wool—Conditioning of Tops—Top Mixing.

### *Open Drawing or Bradford System*

The Principles of Drawing. Numbers of Operations for different Counts of yarn. The use of Logarithms in Drawing Calculations, Study of the Drag—Calculations for Drafts and Twists—Proper Ratch.

The functions of the Weigh Box.

Measuring Stop Motions, Candle Stick, Side Knock-off, etc.

Calculations for length.

Construction and use of Gauge Points or Constants.

Effects of Doubling.

The Dram and Hank Systems for numbering Roving.

### *Cone Drawing*

The object and use of Cone Drawing—Differential Motions, Builder Motions—Calculations for Draft—Twist—Tension and Lay—Adjustment, Speeds and Productions.

### *French Drawing*

The principles and use of French Drawing—Functions of the Porcupine. The principle of Condensing—Manufacturing of Merino Yarns.

### *Spinning, Open or Bradford System*

The Principles of Spinning. Calculations for Draft and Twist—Spinning on the Cap—Flyer and Ring Frames—The Scaife Builder Motion—Drag in Bradford System of Spinning—The use of Straight, Conical and Bell Mouthed Caps. Top Roll, Single and Double Covered, Iron and Wood.

Types of Frames, Leicester and Illingworth; Speeds, Productions, etc.

### *Spinning, French System*

Principles of Worsted Mule Spinning, Calculations for Draft and Twist, Ratch, Drag, Backing off, Winding, Re-engaging, Size and shape of Caps, Builder Motion, Quadrant, Metric and English systems of Calculations.

### *Twisting*

Principles of Twisting, Reeling, Weighing and Numbering of Single and Ply Yarns, Twisting on Cap, Flyer and Ring Frames—Calculations for Twist—Twist testing—Trap Twisters—Effect of direction of Twist; Speeds, Productions, Yarn Testing, etc.

The true difference between Woolen and Worsted Yarns. Layout of Machinery for different classes of Yarns—Power required for different machines—Cost of Machinery and approximate labor cost of each Department, Sorting, Scouring, Carbonizing, Picking, Carding, Combing, Drawing, Spinning, Twisting, etc., for various classes of Yarns, Carpet, Braid, Botany, etc.

#### DESIGNING DEPARTMENT

##### GENERAL COURSE

##### First Year

Options:—Cotton, Woolen and Worsted Yarns.

##### *Design Lectures*

- Point or design paper.
- Intersections, interlacings and cut sections.
- Color effects.
- Reeds and setts.
- Different systems of counting reeds and yarns.
- Twills and diagonals.
- Drafting and reduction.
- Sateen weaves.
- Cut weaves.
- Combination of weaves.
- Spot weaves.
- Plain fabrics and fabrics on a plain basis.
- Names and explanations of different parts of cloth.
- Terms applied to weaves, etc.
- Classifications of fabrics.

##### *Cloth Construction and Cloth Analysis*

- Reproduction of fabrics, planning of patterns, drafts, chains, etc., on paper, including yarn and cloth calculations as below:—
- Relative sizes of yarns.
- Grading of woolen yarns.
- Woolen yarn calculations.
- Methods of finding weight of various lengths of fabrics.
- Calculations for finding sizes of yarns of various denominations.
- Worsted yarn calculations.
- Cotton yarn calculations.
- Calculations for folded or ply yarns.
- Calculations for converting one system of yarns into that of another.
- Calculations for finding weight, counts or length of warp or filling from given data.
- Calculations for reeds.

## *Practical Work*

Color effects.  
Combinations of colored threads.  
Combination of weaves.  
Figured designing on plain ground.  
Figured designing on twill ground.  
Cut Diamonds.  
Checkerboard effects.  
Herringbone stripes.  
Checked goods.  
Colored goods, stripes.  
Drafting of designs.  
Designing from chains and drafts.  
Practical work on hand looms putting into operation the principles taught in the foregoing course, including dressing, beaming, drawing in and reeding of warps.

## **Second Year**

### *Design Lectures*

Twilling.  
Fancy twills.  
Point drafts.  
Double, triple and alternate drafts.  
Lined work.  
Damasks.  
Fancy stripes.  
Sateen stripes.  
Plain and irregular rib weaves.  
Oblique rib weaves.  
Basket weaves.  
Corkscrew and double twill weaves.  
Broken twills.  
Backed cloths, filling and warp.  
Double cloths.  
Multiple ply fabrics.  
Cloths ornamented with extra warp or filling.  
Piques and Welts.  
Bedford cords.  
Marseilles quilting.  
Fancy woolen cassimeres.  
Figured blankets.  
Crepes.  
Trouserings.  
Carriage robes.

### *Cloth Construction and Cloth Analysis*

- Calculations for harness straight, centred or point.
- Calculations for shrinkage or contraction.
- Calculations to find the number of ends per inch in order to use a given weight of warp, also picks per inch to use a given weight of filling.
- Calculations on the proportioning of fabrics.
- Construction of cloth.
- Balance of cloth.
- Amount of material used in the construction of fabrics.
- Analysis consisting of cotton dress goods, ginghams, fancy dress goods, backed and double cloths.
- Calculations for complete specifications of backed and double cloths based upon the structure of cloth.

### *Practical Work*

- Cloth analysis and reproduction of fabrics; planning patterns, drafts, chains, etc., on paper, including all necessary calculations for loom and finished cloth.
- Analyses of fancy woolen and worsted cassimeres, woolen and worsted suitings, overcoatings, blankets, etc. Original designing on all design lectures.

### *Lectures on Color*

- Color theory.
- Color applied to textiles.
- Color values.
- Combination of colors.
- Coloring of plaids and checks.
- Coloring of suitings and trouserings.
- Coloring of ginghams and tartans.
- Coloring of stripes.

## **Third Year**

### *Design Lectures*

- Cotton Velvets.
- Corduroys.
- Cotton pile fabrics, cut and uncut.
- Figured Matelasse.
- Shawls.
- Cotton plushes.
- Chinchilla.
- Worsted and mohair mantle cloths.

Figured double plains.  
 Reversibles.  
 Ingrains.  
 Tapestries.  
 Cotton Gauze.  
 Cotton leno.  
 Cotton lappet.  
 Jacquard designing.  
 Distribution of figures.  
 Determination of area occupied by figures.  
 Jacquard figures formed by the warp or filling.  
 Figures not square.  
 Cloth formed by the combination of Jacquard gauze, and fancy  
     harness weaves.  
 Special designs for Jacquard gauze, and pile fabrics.  
 Jacquard pile and ordinary weaves.  
 Vestings.  
 Golfings.  
 The principles of designing, cloth structure and coloring best  
     adapted to each of the above fabrics.

### *Cloth Construction and Cloth Analysis*

The structure and analysis of all descriptions of compound fabrics,  
     viz:—backed, double, and various types of Jacquard figured  
     fabrics, especially applicable to the cotton and worsted  
     industries.  
 The cost of mixing and blends.  
 The cost of ply yarns.  
 The Metric system.  
 Calculations for woolen and worsted including the various pro-  
     cesses of scouring, fulling and finishing.

### *Practical Work*

Original designs on the foregoing lectures.  
 The complete analysis of a fabric.  
 Practical work on hand looms and putting into operation the prin-  
     ciples taught in the foregoing course.



## DECORATIVE ART DEPARTMENT

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First year. All students attend lectures and class work throughout the year except in the second term, when chemistry students are required to take only the lecture work.

The subject includes illustrated lectures on the History of Art and Textile Fabrics, Color, Planning for Ornament and Lettering. The following historic periods are studied, Egyptian, Greek, Roman, Saracenic, Byzantine, Romanesque, Gothic, Renaissance and Modern. The class work corresponds in subject with the lectures and is taken in the spirit of a "Further inquiry." Copies are made and original interpretations designed.

Aside from a working knowledge of planning of ornament, the principles of design are taught in conjunction with the class work. Only students in the Textile Design course continue work in this department.

This work includes a general survey of Rugs and Laces, and a detailed study of the products of the centres of Textile Industry of Renaissance and Modern times. Connection is made with the Centuries and the historic periods of Cabinet Makers and Great Patrons of Art and careful attention is given to the Historic use of materials, fancy weaves, and color as well as to form.

The work of the second and third years is arranged with a view of fitting students to become designers of stuffs in the various Historic Styles now employed by architects and interior decorators.

Special class in drawing, painting and design for students not taking the other courses of the school.

This class is to provide instruction for students wishing to fit themselves to design textiles, wall-paper, book covers, leaded glass, silver, furniture, etc.

## CHEMISTRY AND DYEING DEPARTMENT

### ELEMENTARY CHEMISTRY

This subject is required not only of the students taking the regular course in Chemistry and Dyeing, but by all others intending to take a complete course and receive the school diploma.

It includes lectures, recitations, and a large amount of individual laboratory work upon the following subjects, and extends through one entire year:—

#### *Chemical Philosophy*

Chemical action, chemical combination, combining weights, atomic weights, chemical equations, acids, bases, salts, Avogadro's law, molecular weights, formulas, valence, periodic law, etc.

### *Non-Metallic Elements*

Study of their occurrence, properties, preparation, chemical compounds, etc.

### *Metallic Elements*

Study of their occurrence, properties, metallurgy, chemical compounds, etc.

### *The Hydrocarbons and their Derivatives*

Study of their occurrence, properties preparation, uses, etc. This work although elementary in character is of sufficient breadth to prepare the student understandingly for the work with the artificial dyestuffs which follows.

### *Qualitative Analysis*

Before the completion of the course, the student takes up as thoroughly as the time will permit, the qualitative detection of the more common metals and non-metals, with practical work.

### **Qualitative Analysis**

Qualitative Analysis is studied by all regular students in Course IV during the second term of the first year. The work is based upon Prescott and Johnson's Qualitative Chemical Analysis and consists of one lecture, one recitation, and not less than twelve hours laboratory work per week. The student must become familiar with the separations and the detections of the common metals and acids by the analysis of a satisfactory number of solutions, salts, alloys, pigments, etc. At intervals during the term, short laboratory tests are given as well as the regular written examinations.

No pains are spared to make the course as valuable to the student as possible and to encourage only thorough and intelligent work.

When sufficiently advanced, students take up the examination of various products with which the textile chemist must be familiar, such as testing mordanted cloths, pigments, and the various dyeing reagents.

During the latter part of this course a certain amount of time is devoted to the preliminary operations of Quantitative Analysis, such as the precipitation and washing of such substances as barium sulphate, magnesium ammonium phosphate, calcium oxalate, etc., although no weighings or actual determinations are made.

A student's marks in this subject depend as much upon the neatness and care used in manipulation as upon the actual results obtained.

### **Stoichiometry**

This subject is taken up by the Chemistry and Dyeing student during the second half of the first year.

The application of the metric system is thoroughly studied, and problems are worked involving the expansion and contraction of gases, determination of empirical formulae, combining volume of gases, quantitative analysis, etc.

### **Advanced Inorganic Chemistry**

The whole subject of Inorganic Chemistry is reviewed during the second year, and many advanced topics are introduced which were necessarily omitted from the first year course in General Chemistry.

### **Advanced Organic Chemistry**

The course consists of lectures and recitations extending through the second year. The principles of organic substitution and synthesis are thoroughly discussed using as many illustrations as the time will permit, particularly such as are applied in the arts. The alliphatic series of hydrocarbons and their derivatives are studied for about twenty weeks of the year, the remainder of the time being devoted to the benzene series. The aim of the course is to lay a broad foundation for the chemistry of the artificial dyestuffs, which is studied in the third year. Students are required to work out problems in the synthesis of various compounds in order to get familiarized with equation writing.

### **Physical Chemistry**

This subject is studied during the third year.

It includes the principles of calorimetry, specific heat, vapor density, the various methods of determining molecular weights, laws of solution, electrolytic dissociation, theories of precipitation, thermo-chemistry, surface tension, etc. The student is required to work out a large number of problems introduced by the subject.

### **Quantitative Analysis**

This subject is taken up by all regular Chemistry and Dyeing students, and extends through the second and third years of the course.

During the second year, the principles of analytical work are thoroughly taught, the work being based on Talbot's Quantitative Chemical Analysis. Gravimetric analysis is studied during the first term, and volumetric analysis during the second term. The samples analyzed include salts, ores, minerals, bleaching powder and alkalis. Frequent recitations

are held for the discussion of methods and the solution of stoichiometrical problems. Students are encouraged to read the standard works and magazines on chemical subjects, in order to cultivate broad views of the science.

The third year work involves chiefly technical analysis, the principal consideration being the analysis of water, alum, ammonia, soaps, coal, indigo, tannin, and the ultimate analysis of organic compounds, as well as the examination of acids, alkalis, oils, scouring materials and such substances as starches, gums, and other thickeners, detection of adulterants, etc.

No pains are spared to give the students the benefits of all the latest researches along the lines of industrial analytical methods, and original work is encouraged in all.

### **Textile Chemistry and Dyeing**

Under this head is included first, the lecture course in Textile Chemistry and Dyeing, which is taken by all regular diploma students; second, the general laboratory course taken by all regular diploma students, except those taking Course IV, and the laboratory and practical work course which is taken by the regular Chemistry and Dyeing students.

#### **OUTLINE OF LECTURE COURSE**

##### *Technology of Vegetable Fibres*

Cotton, Linen, Jute, Hemp, China Grass, etc. Chemical and physical properties, chemical composition, microscopical study, and their action with chemicals, acids, alkalies, heat, etc.

##### *Technology of Animal Fibres*

Wool, Mohair, Silk, etc. Chemical and physical properties, chemical composition, microscopical study, and their action with chemicals, acids, alkalies, heat, etc.

##### *Technology of Artificial Fibres*

Study of the various forms of artificial silk, the process of manufacture, their properties and action with chemicals, acids, heat, etc.

##### *Operations Preliminary to Dyeing*

Bleaching of cotton and linen, wool scouring, bleaching, fulling and felting of wool, carbonizing, silk scouring and bleaching, action of soap.

The bleaching of cotton cloth, yarn and raw stock is studied at length with detailed descriptions of the various forms of kiers and machinery used; also the action of the chemicals used upon the material and the various precautions that must be taken in order to insure successful work.

Under this heading is also included an exhaustive study of the reagents used in the emulsive wool scouring process and their action upon the fiber under various conditions; also the most successful of the solvent methods for degreasing wool.

### *Water and its Application in the Textile Industry*

Impurities present, methods of their detection, their effect during the different operations of bleaching, scouring, dyeing and printing, and the methods for their removal or correction.

The important subject of boiler waters is also studied under this heading with a full discussion of the formation of boiler scale, its disastrous results and the methods by which it may be prevented.

### *Mordants and Other Chemical Compounds used in Textile Coloring not Classified as Dyestuffs*

Theory of mordants, their chemical properties and their application, aluminum mordants, iron mordants, tin mordants, chromium mordants, organic mordants, tannin materials, soluble oil, fixing agents, levelling agents, assistants, and numerous other compounds not dyestuffs that are extensively used in the textile industry.

Under this heading is included the definitions of various terms and classes of compounds, used by textile colorists, such as color lakes, pigments, fixing agents, developing agents, mordanting assistants, mordanting principles, levelling agents, etc.

### *Theory of Dyeing*

A discussion of the chemical, mechanical, solution and absorption theories, and the various views that have been advanced by different investigators of the chemistry and physics of textile coloring processes:

Under this heading is discussed the general methods of classifying dyestuffs and definitions of such terms as textile coloring, dyeing, textile printing, substantive and adjective dyestuffs, monogenetic and polygenetic dyestuffs, etc.

### *Natural Coloring Matters*

Organic, properties, and application of indigo, logwood, catechu or cutch, Brazil wood, cochineal, fustic, tumeric, madder, quercitron bark, Persian berries, and other natural dyestuffs that have been used within recent years by textile colorists.

### *Mineral Coloring Matters*

Under this heading is discussed the properties of such inorganic coloring matters and pigments as chrome yellow, orange and green, Prussian blue, manganese brown, iron buff, etc.

### *Artificial Coloring Matters*

General discussion of their history, nature, source, methods of manufacture, methods of classification, and their application to all fibers.

Special study of:—

Basic Coloring Matters.

Phthalic Anhydride Colors, including the eosins, phloxines, etc.

Acid Dyestuffs.

Janus Colors.

Direct Cotton Colors.

Sulphur Colors.

Mordant Colors, including the alizarines and other artificial coloring matters requiring metallic mordants.

Mordant Acid-Colors.

Insoluble Azo Colors, developed on the fiber.

Reduction Vat Colors, including Artificial Indigo, Indanthrene, Flavanthrene, Viridanthrene and Melanthrene.

Aniline Black and other artificial dyestuffs not coming under the above heads.

As each class of dyestuffs is taken up, the detail of the methods of applying them upon all the different classes of fabrics and in all the different forms of dyeing machines are thoroughly discussed; also the difficulties which may arise in their application, and the methods adopted for overcoming them.

### *Machinery used in Dyeing*

A certain amount of time is devoted to the description of the machinery used in the various processes of textile coloring, which is supplemented as far as possible by the use of charts, diagrams, lantern slides, etc.

Most of the important types of dyeing machines are installed within the dyehouse of the School and the students can be taken directly from the lecture room and shown the machines in actual operation.

### **Outline of Laboratory and Practical Work**

Besides lectures and recitations upon this subject, those taking the regular day course in Chemistry and Dyeing are required to do at least fifteen hours per week of practical laboratory work. By the performance of careful and systematic experiments the student learns the nature



of the various dyestuffs and mordants, their coloring properties, their action under various circumstances and the conditions under which they give the best results. The more representative dyestuffs of each class are applied to cotton, wool and silk, and each student is obliged to enter in an especially arranged sample book, a specimen of each of his dye trials with full particulars as to the conditions of experiment, percentage of compounds used, time, temperature of dye bath, etc.

For convenience and economy most of the dye trials are made upon small skeins or swatches of the required material, but from time to time students are required to dye larger quantities, in the full sized dyeing machines which are described elsewhere.

By the use of a small printing machine the principles of calico printing are illustrated, and by means of the full size dyeing machines, vats, etc., the practical side of the subject is studied. It is the constant endeavor of those in charge, to impart such information of a theoretical and scientific character as will be of value in the operation of a dyehouse.

### **Advanced Textile Chemistry and Dyeing**

This is a continuation of the Textile Chemistry and Dyeing of the second year and includes a review of the second year's work in this subject, with the introduction of many advanced considerations, and in addition, the following subjects:—

#### *Classification and Construction of Artificial Dyestuffs*

A study from a more advanced standpoint of the classification and constitution of the artificial dyestuffs, including the various methods used in their production, also the orientation of the various groups which are characteristic of these compounds, and their effect on the tinctorial power of dyestuffs.

The object of this study is to give the student a more complete knowledge of the artificial dyestuffs from the color manufacturer's point of view, and it will prove of particular value to those who intend later to enter the employ of dyestuff manufacturers or dealers.

This subject cannot be taken by students who have not completed the second year course in Organic Chemistry.

#### *Color Matching and Color Combining*

A study of that portion of physics which deals with color, and of the many color phenomena of interest to the textile colorist, the lecture work being supplemented with the practical application of the spectroscope and tintometer, and much practice in the matching of dyed samples of textile material.

The primary colors both of the scientist and textile colorist and the results of combining colored lights and colored pigments, and such subjects as color perception, color contrast, purity of color, luminosity, hue, color blindness, dichroism, fluorescence, and the effect of different kinds of light upon dyed fabrics are discussed under this heading.

Each student's eyes are tested for color blindness early in the course in order that he may be given an opportunity to change his course if his eyes should prove defective enough to interfere with his work as a textile colorist.

A dark room has been provided where various experiments in color work and color matching may be performed.

### *Dye Testing*

This subject includes the testing of several dyestuffs of each class, to all the common color destroying agencies, the determination of their characteristic properties and their action towards the different fibers. Also the determination of the actual money value and coloring power of dyestuffs in terms of a known standard.

Each student is required to make a record of each color tested upon an especially prepared card which furnishes a permanent record of the dyestuff, its dyeing properties, fastness to light and weather, washing, soaping, fulling, perspiration, bleaching, steaming, ironing, rubbing, acids and alkalis.

### *Union Dyeing*

A study of the principles involved in the dyeing of cotton and wool, cotton and silk, and silk and wool union materials with the production of solid and two colored effects.

### *Textile Printing*

A thorough study of the whole subject of textile printing, each student being required to individually produce no less than twenty different prints including the following styles:— Pigment style, direct printing style, steam style with tannin mordant, steam style with metallic mordant, madder or dyed style, the ingrain or developed azo style, discharge dyed style, discharge mordanted style, resist style, indigo printing, aniline black printing.

The different parts of the calico printing machine are thoroughly studied, the precautions which must be considered in its use and the arrangement of the drying apparatus which must accompany such a machine.

Special attention is paid to the methods of mixing and preparing the various color printing pastes that are used in the above work upon the manufacturing scale as well as experimentally in the laboratory.

### *Cotton Finishing*

A study of the various processes of finishing cotton cloth, and the different materials used therein. The work involves the discussion of the various objects of cotton finishing and such operations as pasting, dampening, calendering, stretching, stiffening and filling, and the various machines used for carrying out these processes.

### *Mill Visits*

During the third year, visits are made to some of the large dye-houses, bleacheries and printworks in the vicinity.

## **Industrial Chemistry**

Special attention has been given to this subject, because it is considered extremely important in the study of chemistry in general, and of textile chemistry in particular. During the second year considerable time is spent in the laboratory in the actual manufacture, from raw materials, of the chemical compounds used in textile work. Each student is required to make careful record of all of the crude materials used, as starting points, and to carry the various processes through as carefully as possible with the view of producing as great and pure a yield of each substance as possible. Industrial Chemistry not only involves the application of the principles of both inorganic and organic chemistry, but of analytical work as well, for the purity of the compounds produced must be tested after their manufacture.

In addition to the general work in this subject, each student is required to make a special study of the manufacture of some chemical from raw materials in considerable quantity (20 to 25 pounds) making a complete quantitative analysis of all the raw materials used and of the finished product, accounting for everything throughout the process with the object of producing as near the theoretical yield as possible. The student is charged with the amount of raw materials at market prices, and the finished product is bought back by the school.

During the past year extensive construction work and much new apparatus has been added to the industrial chemistry laboratory and it is now believed to be one of the most complete of its kind. The present equipment allows of a comparatively large quantity of materials being handled at one time.

During the whole of the third year, lectures and recitations are held in Industrial Chemistry, the course in general following "Thorpe's Outline of Industrial Chemistry." Particular attention is paid to those subjects which are of especial interest to the textile chemist, as oils, soaps, gas and coal tar industry, building materials and the manufacture on a large scale of important chemical compounds, such as the common acids and alkalies, bleaching powder, various mordants, etc. The course is illus-

trated as far as possible with specimens, diagrams and charts, and the students are given an opportunity to visit some of the industrial establishments in the vicinity of Lowell and Boston.

### Microscopy

The value of the microscope in the detection and examination of the various fibres cannot be over-estimated, and often facts may be discovered, and conclusions drawn, which could be arrived at in no other way.

The students in this course are given as much work with the microscope as time will permit. They receive instruction in the use of the high grade microscopes, and not only have practice in the examination and detection of the fibres, but are required to become proficient in the preparation of permanent slides.

Opportunity is also given for students to take microphotographs of fibres and the various slides which they may prepare. A special dark room has been provided for this purpose.

### POWER WEAVING DEPARTMENT

The process of making pattern warps.

The construction and use of Spooling and Quilling Machinery for wool and cotton.

The construction and use of Warpers of various kinds.

Long and short chain systems of preparing warps and filling.

Sizing materials and size mixing machinery.

The Woolen Sizing Machine. The Woolen Beamer.

Drawing-in and Twisting.

Operation of machines named above, and warp preparation in cotton, woolen and worsted, timed to correspond with the respective lecture.

The plain power loom and its construction.

Shedding by cams.

Various pickers and picking motions.

Force of lay.

Take up and let-off motions.

Minor adjustments of the power loom.

Plain looms as altered for weaving fancy cloth.

Looms constructed for several shuttles.

Drop box motions.

Variety of cams for different grades of work.

Principles of Beating-up motion.

Adjusting lag to various grades of cloth.

Different makes of box motions, applied to gingham weaving.

Chain building for box looms.

Shuttle changing looms.

Shedding motions.

- Double acting dobbies.
- Chain building for dobbies.
- Fan reeds.
- Handkerchief motions.
- Leno weaving.
- Centre selvedge motions.
- Automatic looms.
- Filling changing looms.
- Single acting dobbies.
- Spring boxes and other motions for returning harness.
- Oscillating reeds.
- Lappet motions.
- Various shaker motions.
- Towel and other pile cloth weaving.
- Open and close shed looms, for weaving various grades of woolen and worsted cloths.
- Equal and unequal gear driven looms.
- Lectures on Jacquard machinery.
- Single lift Jacquards.
- Double lift Jacquards.
- Leno Jacquards.
- Jacquards specially arranged for ingrain carpet work.
- Tying up Jacquard harness.
- Tapestry weaving, quilt weaving, etc.
- Weave room engineering and equipment.
- Cost of weave mill operation and statistics of operation.

## FINISHING DEPARTMENT

- Examination of cloth from the loom. Perching, Knotting, Burling, Mending, etc.
- Preparation of cloth for the Fulling Mill.
- Flocking and its purpose.
- Construction and use of the Soaping Machine.
- Use of soaps and alkalies for fulling and scouring purposes.
- Construction and use of various types of Fulling Mills and Stocks.
- Theory and method of fulling various classes of goods.
- Construction and use of various types of Washing Machines.
- Theory and method of scouring cloth before and after fulling.
- Cloth Carbonization.
- Hydro Extractors and their use.
- Construction and use of various types of Napping Machines.
- Construction of various types of Gigs.
- Crabbing and Singeing.
- Construction and use of various Starching and Water Proofing Apparatus.
- Construction and use of various types of Tenting and Drying Machines.

Construction of Single and Double Shears.  
 Grinding and Setting Shears.  
 Construction and use of the Steam Brush.  
 Construction and use of Plate and Roller Presses.  
 Method of finishing various classes of Woolen and Worsted goods.  
 Cloth Examining, Measuring, Weighing, Ticketing, Numbering, Rolling,  
 Baling, Casing, and Shipping.  
 Construction and use of the various machines necessary for this purpose.  
 Testing apparatus, etc.  
 All the necessary calculations for the various processes of finishing all  
 classes of goods.

## TEXTILE ENGINEERING

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### Mechanics and Mechanism

Elements of Mechanics.  
 Force, Work, Power and Energy.  
 Measurement of Work and Power.  
 Levers, Toggle Joints, etc.  
 Windlass, Pulley Blocks.  
 Inclined Plane and Wedge Screws.  
 Worm and Wheel.  
 Elements of Mechanism.  
 Angular Velocity.  
 Speed Problems.  
 Rolling Cylinders and Cones.  
 Gearing, Pitch of Gears.  
 Belting problems.  
 Link motions.  
 Harmonic motions.  
 Cam Design.  
 Builder motions.  
 Mangle Wheel.  
 Aggregate Combinations.  
 Epicyclic Trains.  
 Different Motions.  
 Graphic Statics.

### Applied Mechanics

Strength of Materials.  
 Methods of Testing.  
 Trusses, Beams, Columns.



In the topics given will be included as many problems as possible, dealing with the construction and maintenance of mills, not with the purpose of educating mill engineers, but rather to familiarize the student with the means at hand and processes employed in erecting structures for manufacturing, that they may study their government advantageously.

## Steam and Hydraulics

Motive Powers.	Water.	Steam.	Gas.
Water.			
Head and Pressure.			
Measurement of Quantity.			
Measurement of Power.			
Dams, Canals, etc.			
Types of Turbines.			
Efficiency of Modern Turbines.			
Methods of Regulation.			
Steam.			
Elements of Thermodynamics.			
Types of Boilers.			
Fuels and Combustion.			
Chimneys and Mechanical Draft.			
Mechanical Stokers.			
Steam Piping.			
Boiler Test.			
Steam Engine.			
Simple, Compound and Triple Expansion.			
Condensers and Condensing engines.			
Plain side valve.			
Corliss and Cam Gears.			
Methods of Regulation.			
Steam Turbines.			
Use of exhaust steam for heating and dye house purposes.			
Indicator.			
Construction of and use in measuring power and setting valves.			
Engine test.			
Practical use of indicator and computation of indicator diagrams.			
Gas Engine			
Theory and general principles of gas engines.			
Types of explosion and internal combustion engines.			
Methods of Regulation.			
Consumption and costs of operation.			

## **Elementary and Applied Electricity**

Elementary Electricity.  
Magnetism.  
Electrical Measuring Instruments.  
Dynamo Electric Machines.  
Electric Lamps.  
Principles of Alternating Currents.  
Alternating Current Apparatus.  
Electrical Power Transmission.  
Electrical Testing.

In addition to the lectures and recitations in physics, electricity and steam engineering all regular students in the Textile Engineering course will have laboratory practice in the testing of fibres, yarns and fabrics and practical tests on steam and gas engines, motors, generators, pumps, fans, etc. They will also spend additional time on advanced mechanism and machine drawing problems in the drawing room.

## **Mill Engineering**

Mill Construction. Calculations and drawings of modern mill buildings.

Distribution of power and methods of driving machinery.  
Mill Fire Protection.  
Mill Heating and Ventilation.  
Mill Humidifying.  
Lectures on allied subjects by outside lecturers will be added.

## **Mechanical and Machine Drawing**

Care and use of Instruments.  
Geometrical Constructions.  
Elements of Projections.  
Isometric Drawings.  
Sketching from machine details.  
Working Drawings.  
Tracings.  
Blue Print Process.

Mechanism problems, Drawing in connection with course in Mechanism, such as cams, gearing problems and other mechanism designs.

Practical sketching from machines for working detail and assembly drawings.

The regular day students in Textile Engineering will spend a large amount of time in the drawing room on practical mill engineering problems, including construction drawings, machinery layouts, power transmission of a complete mill plant.

(1) Practice in use of Surveying Instrument.

(a) In the field.

(b) Alignment of shafting.

## SCHOOL ADMINISTRATION

CHARLES H. EAMES, S. B., Principal of School. Massachusetts Institute of Technology, 1897. Experience: Secretary of the School, and instructor in electrical engineering and mathematics. Superintendent, Light, Heat and Power Company, Lowell, and engineer with Stone and Webster, electrical engineers, Boston, Mass.

## INSTRUCTORS

### TEXTILE ENGINEERING

GEORGE H. PERKINS, S. B., chief instructor in mechanical engineering. Massachusetts Institute of Technology, 1899. Experience: draftsman, Ludlow Manufacturing Company.

LOUIS F. BLUME, E. E., instructor in mathematics, physics and electrical engineering. Lehigh University, 1905. Experience: testing department, General Electric Company, Schenectady, N. Y.

HERBERT J. BALL, S. B., assistant instructor in mechanical engineering. Massachusetts Institute of Technology, 1906.

### CHEMISTRY AND DYEING

LOUIS A. OLNEY, A. C., chief instructor. Lehigh University, 1896. Experience: instructor, Brown University.

G. CARL SPENCER, S. B., instructor in chemistry. Worcester Polytechnic Institute, 1897.

JOHN B. REED, A. B., instructor in chemistry. University of Michigan, 1903. Experience: instructor in chemistry, University of Maine, two years.

ROBERT R. SLEEPER, instructor in dyeing. Lowell Textile School, 1900. Experience: Read, Holliday and Sons, Limited, New York City; H. A. Metz and Co., New York City.

RUSSELL W. HOOK, instructor in dyeing. Lowell Textile School, 1905.

### DECORATIVE ART

EUGENE W. CLARK, JR., chief instructor. Honor Graduate School of Design, Boston Museum of Fine Arts, 1904. Architectural experience: Little and Browne, Boston; George H. Ingraham, Boston.

ELIZABETH WHITNEY, instructor freehand drawing. Normal Art School, Boston, 1882. Pupil of Dr. Denman W. Ross, lecturer in design, Harvard University. Experience: teaching, fifteen years.

### DESIGN

FENWICK UMPLEBY, chief instructor. Honors, graduate textile department, Victoria College, Leeds, Eng., 1884; Graduate Chautauqua College, New York, 1888, and Cours de Vacancies, et l'Alliance Française, Paris, 1906. Experience: chief designer, Gilbert Manufacturing Company, Massachusetts, and Globe Worsted Mills, New York.

ARTHUR F. FERGUSON, instructor. Lowell Textile School, 1903. Experience: Chapman, Kendal and Daniels, wholesale dry goods, Boston, Mass.

STEWART MACKAY, instructor in hand loom weaving. Lowell Textile School, 1906.

#### COTTON YARNS AND KNITTING

STEPHEN E. SMITH, chief instructor. Lowell Textile School, 1900. Experience: draftsman, Lowell Machine Shop; Atlantic Cotton Mills, Lawrence, Mass., and Shaw Stocking Company, Lowell, Mass.  
..... instructor cotton yarns.

#### WOOLEN AND WORSTED YARNS

EDGAR H. BARKER, chief instructor. Massachusetts Institute of Technology, 1896. Experience: Pacific Mills, Lawrence, five years; E. Frank Lewis, Lawrence, wool scouring, one year.

JOHN N. HOWKER, instructor in wool sorting and scouring. Technical School of Saltaire, near Bradford, Eng. Certificate from City and Guilds of London. Experience: Saltaire Mills, Yorkshire, Eng., Goodall Worsted Company, Sanford, Me.; Arlington Mills, Lawrence.

HENRY H. CROMPTON, instructor in Drawing and Spinning of the English and French systems. Lowell Textile School, 1899. Experience: Arlington Mills, eighteen years on the Bradford and French System.

HENRY B. ARUNDALE, instructor in woolen spinning. Lowell Textile School, 1905.

#### WARP PREPARATION AND POWER WEAVING

WILLIAM NELSON, chief instructor. Harris Institute, Preston, Eng., 1887. Certificate of City and Guilds Institute, London, Eng. Experience: Springfield and Alexandria Mills, Preston, Eng.; overseer, Jacquard weaving, North Manufacturing Company, Chorley, Eng.; Ponemah Mills, Taftville, Conn.

JOSEPH WILMOT, instructor. Experience: loom fixer, U. S. Bunting Company, Lowell, Mass.

JOHN R. WALMSLEY, instructor. Experience: Pierce Manufacturing Company, New Bedford, Mass., nine years.

#### FINISHING

ARTHUR A. STEWART, chief instructor. Lachine Academy, Canada. Lowell Textile School, 1900. Experience: Dominion Woolen Manufacturing Company, Montreal, Canada; Bay State Mills, Lowell Mass.; Nonantum Worsted Mills, Newton, Mass.; instructor, woolen and worsted yarns, Lowell Textile School.

#### LANGUAGES

PAUL E. KUNZER, Ph. D., instructor in commercial languages. President, New England College of Languages, Boston, Mass.

FREDERICK A. WOOD, Ph. D., instructor in English. Ph. D. Columbia University, Economics, 1894. A. B. Dartmouth College, 1886.

## ALUMNI ASSOCIATION

The Alumni Association of the School holds its annual meeting and banquet in Lowell on commencement day.

The membership of the Association is restricted to graduates of the day school. Active membership is open to diploma graduates and associate membership to those obtaining a certificate. Honorary membership is open to the Board of Trustees, the Faculty and Board of Instructors and such others as may be elected by the Association.

The officers for year ending June, 1908 are:

President:	Spencer H. Haskell, '07
Vice-President:	Arthur J. Hennigan, '06
Sec.-Treasurer:	Arthur A. Stewart, '00

Board of Directors: The President, Vice-President, Sec.-Treasurer, Henry A. Bodwell, '00, and Stephen E. Smith, '00. Communications should be addressed to Arthur A. Stewart, Lowell Textile School.

## NEW YORK ASSOCIATION of the Lowell Textile School Alumni

This association was organized in January 1906 by the graduates of the school located in and about the City of New York. Its purpose is to preserve a lively interest in the welfare of the Lowell Textile School, to stimulate the early friendships made at the school, and continue the study of problems of general interest to the textile trade. Meetings are held every month during the winter from October until April. The officers for 1907-08 are as follows:

President:	James H. Cuttle, '99
Vice-President:	Herbert A. Currier, '06
Sec.-Treasurer:	I. Walwin Barr, '00

Board of Directors: The President, Vice-President, Sec.-Treasurer, Wm. K. Dennison, F. Austin Clapp. Communications should be addressed to I. Walwin Barr, Secretary, care of Lawrence & Co., 24 Thomas Street, New York.

## THE SOUTHWICK TEXTILE CLUB

The object of the Club is to promote the welfare of the School and the social and intellectual interests of its past students.

The membership is restricted to all persons who have attended the day classes of the School for at least one year and who are not, at the time of making application to the Club, students thereof.

The Club was organized on February 23, 1907, and at present has about forty members. The officers of the Club are:

President:	Royal P. White, '04
Vice-President:	Arthur C. Varnum, '06
Sec.-Treasurer:	Arthur A. Stewart, '00

Executive Board: President, Vice-President, Secretary-Treasurer, Henry A. Bodwell, '00, and Stephen E. Smith, '00.

# REGISTER OF DAY STUDENTS

1906-1907.

## Third Year

Name	Course	Address
Bicknell, Karl A.	IV	Lowell, Mass.
Brownell, Perry R.	II	Fitchburg, Mass.
Church, Charles R.	II	Lowell, "
Coman, James G.	I	Lowell, "
Craig, Albert W.	IV	Lawrence, Mass.
Eames, Alden N.	IV	Wilmington, "
Ehrenfried, Jacob B.	II	Boston, "
Farmer, Chester J.	IV	Andover, "
Hadley, Walter E.	IV	Lowell, "
Haskell, Spencer H.	II	Worcester, "
Hathorn, George W.	IV	No. Andover, "
Hildreth, Harold W.	II	Westford, "
Hoyt, Charles W. H.	IV	Lowell, "
Kinne, Roy W.	I	Housatonic, "
Knowland, Daniel P.	IV	Marblehead, "
Lane, John W.	I	Wakefield, "
Merriman, Earl C.	II	Shirley, "
Raymond, Charles A.	IV	Essex, "
Robertson, Norval	IV	Lowell, "
Shea, Daniel J., Jr.	IV	Fitchburg, "
Southgate, Herbert R.	II	Worcester, "
Storer, Francis E.	II	West Roxbury, "
Stott, Charles H.	IV	Lawrence, "
Stursberg, Paul W.	II	New York City
Woodcock, Eugene C.	II	Lawrence, Mass.

## Second Year

Abbott, George R.	II	Andover, Mass.
Bain, William A.	IV	Sabattus, Me.
Baker, Harold H.	I	Worcester, Mass.
Ballard, Horace W. C. S.	IV	Marblehead, "
Campos, Guy J.	III	Lowell, "
Dwight, John F., Jr.	II	Dorchester, "
Ellis, Dwight W.	II	Monson, "
Farr, Leonard S.	II	Holyoke, "
Field, Osmond F.	VI	Lowell, "
Gay, Olin D.	II	Cavendish, Vt.
Huising, Geronimo	I	Jaro, Iloilo, P. I.
Jenckes, Leland A.	VI	Dorchester, Mass.
Lewis, Leroy C.	IV	No. Woburn, "
Lowell, James E.	II	Worcester, "
Mailey, Howard T.	II	Lynn, "
Mason, Archibald L.	VI	Billerica, "
Morton, Howard N.	I	Lowell, "
Musgrave, Albert F.	IV	Cohoes, N. Y.



Name	Course	Address
O'Sullivan, Bartholomew B.	IV	Andover, Mass.
Parker, Clarence A.	III	Lowell, "
Parker, Herbert L.	II	Lowell, "
Perkins, Joshua D.	III	E. Bridgewater, "
Prince, Sylvanus C.	VI	Lowell, "
Proctor, Braman	IV	Wrentham, "
Read, Paul A.	I	New Boston, N. H.
Reynolds, Fred B.	II	No. Andover, Mass.
Robinson, Ernest W.	IV	Haverhill, "
Sargent, James M.	VI	Lowell, "
Strauss, Leon	II	Boston, "
Weeks, Lauris A.	III	Revere, "
Weinz, William E.	IV	Roxbury, "
Wingate, William H.	IV	Lawrence, "
Winslow, Walter C.	IV	Ayer, "

### First Year

Bonan, Leo F.	III	Lowell, Mass.
Boyd, William	II	No. Adams, "
Brainerd, Arthur T.	IV	Bradford, "
Brooks, George L.	I	Claremont, N. H.
Brower, Egmont G.	I	Utica, N. Y.
Bunce, Raymond H.	III	No. Adams, Mass.
Burns, William M.	IV	No. Adams, "
Callahan, John J.	IV	Everett, "
Clapp, Joseph A.	II	Boston, "
Coburn, Clarence E.	III	Lowell, "
Collingwood, Hueston	II	Plymouth, "
Conant, Harold W.	I	Littleton Common, "
Eidam, Louis M.	II	Lawrence, "
Eveleth, Paul H.	II	Lowell, "
Fairbanks, Almonte H.	III	Wakefield, "
Fairbanks, William S.	III	Fitchburg, "
Ferguson, William G.	II	Springvale, Me.
Fiske, Starr H.	II	Winthrop, Mass.
Fitzpatrick, William J.	VI	Brookline, "
Girard, Harry N.	III	Lowell, "
Gray, Robert C.	III	Lawrence, "
Gyzander, Arne	IV	Wilmington, "
Hanlon, David A.	III	Dracut, "
Hazeltine, Carroll E.	—	Haverhill, "
Holden, Francis C.	IV	Lawrence, "
Kay, Harry P.	II	Oxford, Me.
Laughlin, James K.	II	East Greenwich, R. I.
Lawrence, Levi	III	Fitchburg, Mass.
Levi, Alfred S.	IV	New York City
Liang, Ying C.	II	Chefoo, China
MacPherson, John R.	IV	No. Adams, Mass.
McCarthy, Fred	IV	Haverhill, "
Mullen, Arthur T.	II	Dorchester, "
Murphy, Raymond V.	IV	Haverhill, "
Murray, James	IV	Lawrence, "
Murray, Thomas H.	IV	Dorchester, "
Newall, John D.	IV	Lawrence, "
O'Brien, John A.	III	Gleasondale, "

Name	Course	Address
O'Riordan, Andrew	VI	Lowell, Mass.
Ormiston, John E.	IV	Oakland, Me.
Parkis, William L.	I	Whitinsville, Mass.
Paton, Raymond	III	Newtonville "
Pease, Chester C.	I	Lowell, "
Poore, Frederic S.	II	Lawrence, "
Potter, Carl H.	VI	Ludlow, "
Prescott, Walker F.	IV	Lawrence, "
Rand, Glea L.	III	Bradford, N. H.
Reilly, Thomas W.	I	Taunton, Mass.
Sanborn, Waldo H.	IV	Lawrence, "
Saunders, Harold F.	IV	Andover, "
Scherer, George H.	IV	Walpole, "
Smith, Harry M.	IV	New Hartford, Conn.
Stone, Ira A.	IV	Beachmont, Mass.
Stowell, Joe S.	I	Lowell, "
Ting, Lien S.	II	Shanghai, China
Valpey, Frank D. R.	VI	Lawrence, Mass.
Webber, Marcus B.	VI	Bedford, "
Webster, Natt H.	IV	Lawrence, "
Wescott, Charles A.	VI	Hopedale, "
Whelan, Francis T.	III	Lowell, "
White, Charles B.	II	Andover, "
Williams, Roy P.	III	Springfield, "
Winn, Lyman E.	VI	Haverhill, "
Wood, Ernest H.	III	Andover, "
Wood, J. Carleton	IV	Haverhill, "

### Specials

Bajus, Helen	IIIb	Vancouver, B. C.
Brannen, Leon V.	III	Philadelphia, Pa.
Hanglin, Albert J.	IV	Lowell, Mass.
Meek, Lotta	IIIb	Lowell, "
Russell, Howard I.	I	Manchester, N. H.
Wheeler, Wendell W.	IIIb	Lowell, Mass.
Wilson, Ralph A.	VI	Lowell, "

# REGISTER OF EVENING STUDENTS

1906 - 1907

## EXPLANATORY NOTE

- Course, I, Cotton Spinning
- Course II (a) Woolen Spinning
- Course II (b) Worsted Spinning
- Course III Designing
- Course IV Chemistry and Dyeing
- Course V (a) Cotton Weaving
- Course V (b) Woolen and Worsted Weaving
- Course V (c) Dobby and Jacquard Weaving
- Course VI (a) Mechanics
- Course VI (b) Mechanical Drawing
- Course VI (c) Architectural Drawing
- Course VI (d) Freehand Drawing
- Course VI (e) Mathematics
- Course VII Finishing
- Course VIII Knitting

## POST GRADUATE

Name	Course	Address
O'Neill, Peter F.	IV	Lawrence, Mass.
Tonge, John	IV	" "

## FOURTH YEAR

Bastow, Stephen W.	IV	Nashua, N. H.
Hanglin, Albert J.	IV	Lowell, Mass.
Hebert, Charles L. J.	IV	" "

## THIRD YEAR

Arundale, Henry B.	IV	Lawrence, Mass.
Barrington, James L.	IV	Methuen, "
Bayard, Pierre P.	III	Lowell, "
Brownell, Perry R.	IV	" "
Buckley, Harry	IV	Lawrence, "
Campbell, Archibald	IV	Lowell, "
Flint, Leon G.	III	Lawrence, "
Hardman, David B.	IV	" "
Kelly, Michael H.	III	Lowell, "
Kinne, Roy W.	IV	" "
Lake, Wm. F.	III	" "
Livingston, Harris R.	IV	" "
Loiselle, Yvonne M.	III	" "
Marjerison, T. Sydney	III	Lawrence, "
Martin, Willard E.	III	Somerville, "
Porter, George K., Jr.	III	Dorchester, "
Shackleton, John H.	IV	Lawrence, "
Spurr, James H., Jr.	IV	" "
Stewart, George	IV	" "
Storer, Francis E.	IV	Lowell, "
Webb, Francis H.	III	" "
Webber, John F.	III	Roxbury, "
Wiggin, Leon M.	III	Lowell, "
Wolger, John J.	III	Methuen, "

# SECOND YEAR

Name	Course	Address
Abell, Frederick T.	I	Lawrence, Mass.
Ackroyd, Theodore C.	IIb	Methuen, "
Alexander, Jesse	VIa	Lowell, "
Allen, Walter M. N.	VIa	" "
Arnold, Warren H.	III	" "
Arvidson, Carl A.	IV	" "
Baker, Harold H.	IV	" "
Ballinger, Frederick W.	IIb	No. Chelmsford, "
Barber, James E.	IIb	" "
Barraclough, John C.	I	Lawrence, "
Bayard, Pierre P.	I	Lowell, "
Beale, Harold E.	III	" "
Bean, Byam M.	VIa	Billerica, "
Begen, Thomas W.	IIb	Lawrence, "
Berry, Alfred H.	VIa	Lowell, "
Bottomley, Jesse	IV	Lawrence, "
Brannen, Leon V.	IIb	Lowell, "
Brown, James T.	III	" "
Brown, Walter L.	I	" "
Bucklitsch, Gustave J.	IIb	Lawrence, "
Bunker, Gordon	III	Lowell, "
Burns, Bertram H.	VIa	Lawrence, "
Butterworth, John A.	IIb	" "
Carden, Francis E.	IIb	Lowell, "
Carlson, Ernest B.	IIb	West Chelmsford, "
Carroll, Charles E.	VIa	Lowell, "
Caswell, Alfred M.	VIa	" "
Chapdelaine, Emmanuel A.	VIa	" "
Chase, Robert F.	IIb	" "
Clancy, John P.	III	" "
Clapp, Joseph A.	III	" "
Collie, John	III	Lawrence, "
Cowdrey, Charles E.	III	No. Billerica, "
Daly, Edward W.	III	Lowell, "
Dick, Hugo P.	IIb	Lawrence, "
Dimlick, Wm. F.	IV	" "
Dixon, Arthur	III	Methuen, "
Dobbs, Wm.	IIb	Lowell, "
Dudley, Frank L.	IV	" "
Dunn, George C.	III	" "
Dyson, John J.	VIa	No. Andover, "
Elston, Frank	IIb	Methuen, "
Filteau, Joseph C.	VIa	Lowell, "
Foster, Clifford E.	IIb	" "
Foster, George W.	IV	Lawrence, "
Frechette, Alphonse J.	IIb	" "
French, George E.	VIa	Lowell, "
Gamache, Emile	VIa	" "
Garvin, James	III	" "
Gaunt, Ernest H.	III	Methuen, "
Gauthier, Almon I.	VIa	Lowell, "
Green, Frank C.	VIa	" "
Gregson, Robert B.	I	" "
Gunston, Walter J.	III	" "
Gustafson, Anders S.	VIa	" "

Name	Course	Address
Haas, Ignatius	I	
Hamblett, Harry A.	I	Lowell, Mass.
Hanson, Edward	III	" "
Hyde, Frederick	III	" "
Kelleher, David A.	IV	" "
Kirkland, Alexander S.	VIa	Lawrence, "
Lagerblad, Jarl	IV	Lowell, "
Lang, Wm. A.	I	Lawrence, "
Lee, Walter	VIa	Lowell, "
Marsden, William	III	" "
Marshall, Fred K.	VIa	No. Andover, "
Mathison, John A.	VIa	Methuen, "
McCormick, James H	VIa	Lowell, "
McKinnon, Duncan	III	" "
McNally, Edward T.	VIa	Methuen, "
Meister, Peter	VIa	Lawrence, Mass.
Mitchell, John W.	VIa	" "
Nelson, Charles E.	IIb	Lowell, "
Nelson, Warren B.	IV	West Chelmsford, "
Neubert, Oscar A.	IIb	Nashua, N. H.
Nutter, James R.	VIa	Lawrence, Mass.
O'Brien, Michael F.	IIb	Lowell, "
O'Brien, Wm. P.	III	" "
O'Neill, Charles F.	IV	Roxbury, "
Osbeck, Wm. J.	III	Lowell, "
Pasho, Harry J.	VIa	" "
Patterson, Alfred H.	III	Billerica, "
Picken, Wm.	III	Lawrence, "
Preble, George A.	III	No. Chelmsford, "
Redman, H. Stewart	I	Lowell, "
Reynolds, Eugene A.	VIa	" "
Ritter, Alfred E.	IIb	" "
Robbins, John	IIb	Lawrence, "
Robinson, Edwin S.	VIa	No. Chelmsford, "
Rousseau, Ferdinand	VIa	Lowell, "
Roux, Arthur J.	VIa	" "
Rutyna, Barney	IV	" "
Saalfrank, Joseph C.	II?	" "
Scally, Edward	VIa	Lawrence, "
Seddon, Noah G.	III	Lowell, "
Semple, Alexander	III	Lawrence, "
Senior, George	I	Lowell, "
Sheehan, Wm. F.	IV	" "
Sidebottom, John W.	VIa	" "
Silk, Bruno	VIa	" "
Simoneau, Verner W.	VIa	Tewksbury, "
Stratton, Joseph J.	VIa	Lowell, "
Sykes, Alvin E.	VIa	Lawrence, "
Trickett, James	VIa	Lowell, "
Turner, Roscoe C.	VIa	Lawrence, "
Vincent, Wm.	VIa	Lowell, "
Waddell, Robert A.	III	" "
Wahlberg, Einar	I	Lawrence, "
Whittaker, Thomas	IIb	Lowell, "
Whitworth, Albert	III	Lawrence, "
Wholey, Wm. P.	I	Lowell, "
		" "

Name	Course	Address
Wiesner, Alfred H.	III	Lawrence, Mass.
Willgeroth, Henry J.	III	" "
Wilmot, Joseph	III	Lowell, "
Wiswall, Frank T.	III	Lawrence, "

#### FIRST YEAR

Abbott, Albert L.	VIe	Lowell, Mass.
Abbott, Paul W.	VIa	" "
Abbott, Wendell P.	III	Lawrence, "
Aitken, Alexander	VIa	Lowell, "
Alexander, Jesse	VIa	" "
Alter, Frederick A.	III	Lawrence, "
Amiot, Louis H.	Vc	Lowell, "
Anderson, Alexander C.	IIa	" "
Anderson, Carl E.	IIb	Lawrence, "
Anderson, Gustaf	VIa	Lowell, "
Anderson, John N.	VIb	Lawrence, "
Armstrong, Alfred	Va	Lowell, "
Armstrong, Elias B.	VII	Waltham, "
Audet, Emile J.	Vb	Lowell, "
Bachmann, Bernhard B.	Va	Lawrence, "
Bailey, Agnes	VIc	Lowell, "
Baillet, Alfred, Jr.	VIa	Lawrence, "
Bain, Wm. A.	VII	Lowell, "
Bake, Herbert	VII	Methuen, "
Barnes, Helen W.	VIc	Lowell, "
Barrington, Frederick H.	IV	Methuen, "
Barry, John J., Jr.	IV	Lawrence, "
Bean, Byam M.	VIa	Billerica, "
Bean, Harry A.	VIa	Lowell, "
Belanger, Ernest M.	IV	" "
Benoit, Benjamin S.	VIb	" "
Benoit, Wm. A.	Va	Lawrence, "
Bergman, Curtis A.	IV	Lowell, "
Bernier, Salus	Va	" "
Bickford, Ralph E.	VIa	West Chelmsford, "
Bicknell, Karl A.	VIe	Lowell, "
Biggs, Albert H.	VIb	" "
Bills, Walter	VIc	" "
Birkby, Charles H.	IV	" "
Blake, Charles R.	III	" "
Blakely, Robert C.	III	" "
Blanchard, Andrew	Va	" "
Bocock, David	Vb	" "
Booth, Wilfred L.	VIa	" "
Bouille, Arthur L.	Vb	Lawrence, "
Bourke, Arthur	VIa	Lowell, "
Bowen, Herbert E.	III	" "
Brannen, Leon V.	IIa	" "
Brouder, John J.	VII	Methuen, "
Brower, Egmont G.	Va	Lowell, "
Brown, James P.	Vb	" "
Brown, Ralph L.	IIa	" "
Brown, Walter L.	I	" "
Brunelle, Oliver	VIc	" "
Bryant, Ernest L.	VIe	" "
Buckley, John J.	IIa	" "



Name	Course	Address
Burgess, Joseph H.	Vb	Lawrence, Mass.
Burnham, Wilmont V.	Vc	" "
Burns, Bertram H.	VIa	" "
Butler, Elizabeth M.	VI d	Lowell, "
Butterworth, Charles A.	Va	" "
Callahan, Cornelius J.	III	Lawrence, "
Callahan, Daniel F.	VIa	Lowell, "
Carbonneau, Odilon A., Jr.	VIa	Lawrence, "
Carlin, James J.	VIb	Lowell, "
Carlson, Edwin W.	VIa	West Chelmsford, "
Carlson, Frank W.	IIb	Lowell, "
Carney, William J.	I	Lawrence, "
Carr, Charles H.	III	Lowell, "
Carr, Henry I.	IV	Lawrence, "
Carrie, Wm.	VIa	Andover, "
Carroll, Charles E.	VIa	Lowell, "
Carroll, Frank D.	Vb	" "
Carville, Albina A.	VIb	" "
Caswell, Alfred M.	VIa	" "
Chapdeaine, Emmanuel A.	VIa	" "
Charette, Elias	VIb	" "
Charron, Edmund	VIb	" "
Chretien, Joseph A. N.	VIb	" "
Christie, Robert J.	VIc	" "
Christison, Hugh	IV	Lawrence, "
Clark, Harry D.	IIb	" "
Clarke, Samuel	IV	Lowell, "
Cochrane, George I.	IV	" "
Cockell, Frederick H.	III	Lawrence, "
Coffin, Arthur R.	IIb	Lowell, "
Colby, Arthur D.	VIe	" "
Connors, Arthur V.	VIa	" "
Cook, Walter E.	IV	" "
Counter, Thomas	III	Lawrence, "
Cove, James R.	VIe	Lowell, "
Coveney, Edward L.	VIII	Somerville, "
Cover, Ellen B.	III	Lowell, "
Cox, Wm. F.	VII	" "
Craik, James B.	III	Andover, "
Dana, Clarence A.	VIe	Lowell, "
Deehan, Charles	IV	" "
Delderfield, William	Vb	" "
Dempster, Charles	I	" "
Devine, Henry F.	VIa	" "
Dick, Hugo P.	IIb	Lawrence, "
Dimlick, Benj. C.	VII	" "
Dixon, Frank H.	VIb	Dracut, "
Dodge, Charles P.	IIa	Lowell, "
Donahue, Michael F.	VIe	" "
Donaldson, James H.	Vb	Andover, "
Doyle, Thomas W.	VIe	Lowell, "
Driscoll, Charles J.	IV	" "
Duce, Benjamin	VII	No. Andover, "
Dulligan, Charles	VIe	Lowell, "
Dulligan, Lawrence	VIa-c	" "
Dunklee, Harry W. F.	IIb	" "
Durning, Robert W.	III	" "

Name	Course	Address
Dyson, John J.	VIa	No. Andover, Mass.
Edelstone, Wm.	IIa	Roxbury, "
Edwards, Addie E.	III	Lowell, "
Ekengren, Johan A.	VIb	" "
Ellis, Arthur G.	III	Lawrence, "
Ellis, Oscar P.	VIc	Lowell, "
Elston, Ernest	III	Methuen, "
Evans, Leo F.	IIa	Lowell, "
Fallon, John J.	VIII	Dorchester, "
Farrisey, Wm. J.	IV	Lawrence, "
Fielding, Benjamin O.	Vb	Lowell, "
Filteau, Joseph C.	VIa	" "
Findeison, Hugo P.	VIa	Salem Depot, N. H.
Fisher, Frederick L.	III	Methuen, Mass.
Fitzgerald, Frank A.	III	" "
Fitzgerald, Thomas F.	VI d	Lowell, "
Flannery, Charles T.	III	" "
Fletcher, Harold C.	IV	Lawrence, "
Flynn, Wm. J.	Vb	No. Billerica, "
Foley, Thomas E.	III	Lowell, "
Foxcroft, Alfred N.	VIa	" "
French, George E.	VIa	" "
Gaines, Bertha E.	VI d	Lawrence, "
Gallagher, John F.	VIb	Lowell, "
Gamache, Emile	VIa	" "
Garrison, Amos	VIa	" "
Garvey, John C.	VIc	" "
Gaunt, Merrill S.	III	Methuen, "
Gauthier, Almon I.	VIe	Lowell, "
Gaynor, George P.	VIb	" "
Gildea, Marguerite F.	VI d	Lawrence, "
Gilinson, Philip J.	VIa	Lowell, "
Gillespie, James E.	VII	No. Andover, "
Gleekman, Morris	VIb	Lawrence, "
Goodchild, George	VIe	Lowell, "
Gordon, Herbert E.	III	* Methuen, "
Gosselin, Eugene	VIb	Lowell, "
Grandison, Louis J.	VIII	Charlestown, "
Greely, Sidney W.	VIa	Lowell, "
Green, Frank C.	VIa	" "
Green, Henry F.	VIb	" "
Greene, Benj. C.	I	" "
Greenhalge, James	Va	" "
Greenough, James E.	VIa	" "
Greenwood, Edgar	III	" "
Gregson, Robert B.	Vc	" "
Gustafson, Alfred L.	IV	" "
Gustafson, Anders S.	VIa	" "
Haartz, John C.	VII	Somerville, "
Haas, Ignatius	I	Lowell, "
Haggerty, John M.	VIa-b	" "
Haigh, William	Vc	" "
Haithwaite, George Q. R.	IV	" "
Haithwaite, James	I-Va	" "
Haley, James J.	VIe	" "
Hall, Sydney H.	VIc	" "
Hall, William, Jr.	VIb	" "

Name	Course	Address
Handley, John J. F.	IV	Lowell, Mass.
Hanglin, Wm. E.	Vb	" "
Hanley, John E., Jr.	Va	Collinsville "
Hanlon, Charles R.	VIII	Dorchester, "
Hanson, Carl H.	VIa	West Chelmsford, "
Hanson, Vigo A.	III	So. Boston, "
Hardman, Frank	Vb	Lowell, "
Hardman, William	Vb	" "
Harris, Louis	III-Vb	Jamaica Plain, "
Hartwell, Henry E.	VIe	Lawrence, "
Hastings, Arthur J.	VIa	Lowell, "
Hatch, Allen L.	III	" "
Heys, John T.	I-Va	" "
Hill, Ernest L.	IV	" "
Hill, Harold	I	Methuen, "
Hill, Richard C.	III	Lowell, "
Hillier, Arthur P.	I Ib	No. Chelmsford, "
Hintze, Thomas F.	Va	Lowell, "
Hitchen, Harry S.	Vb	No. Billerica, "
Hitchen, Thomas G.	Vb	" " "
Hobbs, Atwood B.	VIa	Lowell, "
Hoelzel, William R.	VIa	Lawrence, "
Holgate, Benjamin	VIe	Lowell, "
Holt, Albert	III	" "
Holt, Gavin	I-Va	" "
Holt, Harry C.	VIa	Tewksbury, "
Holt, Luther, Jr.	VIe	Lowell, "
Holt, Sumner S.	VIe	" "
Horne, George C.	IV	Lawrence, "
Houghton, Randall B.	I Ib-VIb	Lowell, "
Houston, William I.	III	Lawrence, "
Howard, Henry M.	I	Lowell, "
Howard, John	VII	" "
Howard, Levi W.	VIe	" "
Hoyle, Edward	IV	No. Chelmsford, "
Hoyle, John R.	Vb	Lowell, "
Hutton, Harold	III	" "
Hutton, John M.	III	" "
Ignatius, Pentti	III-Va	" "
Ingham, Benjamin W.	I	" "
Irving, John T.	VIa	" "
Jackson, Frank	V Ib	Methuen, "
Jacques, Yvonne E.	III	Lowell, "
Jenckes, Leland A.	IV	" "
Jepson, Harry	Vb	" "
Johnson, John H.	VIa	" "
Johnson, Owen H.	V Ib	" "
Johnston, Robert W.	VIe	" "
Keene, Thomas R.	V Ib	" "
Kelley, Bernard J., Jr.	V Ic	" "
Kennedy, John C.	I Ib	Lawrence, "
Kingsley, Benjamin F.	V Id	Lowell, "
Kingsley, Mabelle F.	V Id	" "
Kirsch, Alfred O.	Vb	Lawrence, "
Knowles, Frank E.	IV	Lowell, "
Koschitzky, Walter R.	VIa	Lawrence, "
Koskela, Otto R.	Vb	Lowell, "

Name	Course	Address
Lacouture, Harry W.	VIa	Lowell, Mass.
Laffert, August W.	VII	Lawrence, "
Lake, Mabelle D.	VId	Lowell, "
Lamarre, Edgar L. J.	Vb	" "
Lamoureux, Joseph H.	VIa	" "
Lamson, George F.	VIe	" "
Lang, Wm. A.	III	" "
LaPlante, George W.	VIb	" "
Lavoie, Eugene	VIa	" "
Lawson, John B.	VIa	Andover, "
Leach, Ernest	Vb	Lowell, "
Leck, Arthur J.	III	Lawrence, "
LeClerc, Albert	VIa	Lowell, "
Lecoures, Costar P.	III	" "
Lee, Walter	VIa	" "
Lees, George W.	IV	" "
Lequin, Adelard A.	VIa-b	" "
Leveille, Arthur	VIc	" "
Lincourt, Henry E.	VIc	" "
Lodge, Harry	III	Methuen, "
Loranger, Arthur	VIa	Lowell, "
Lowell, Edward M.	VIa	Methuen, "
Lowell, James E.	IV	Lowell, "
Lynch, John A.	VIa	" "
Lyons, John A.	Vb	" "
Macartney, Gardner M.	III	Lawrence, "
MacElroy, Archibald G.	III	Lowell, "
Macey, Freeman L.	I	" "
MacLachlan, Alexander L.	VIa	Melrose, "
MacRitchie, Donald	VId	Lowell, "
Maguire, James H.	VIe	" "
Maguire, Joseph A.	VIa	" "
Mahan, James	VIa	" "
Maither, George C.	VIe	" "
Maker, Isaac A.	I	" "
Mathison, Frederick C.	VId	" "
Mathison, John A.	VIa	" "
Mathison, Walter	IV	" "
McAleer, James F.	VId	" "
McAulay, Donald	VIa	" "
McBride, Robert G.	III	" "
McCarthy, Joseph F.	VII	Lawrence, "
McCromick, James H.	VIa	Lowell, "
McCrillis, John E.	VIa	Lawrence, "
McDevitt, Charles	I	Lowell, "
McElroy, Wm. H.	IV	" "
McFarland, Lee P.	VIc	" "
McGill, Charles F.	VII	No. Billerica, "
McGregor, James A. G.	VIe	Lowell, "
McKenna, Joseph H.	Va	" "
McKittrick, Kenneth J.	VIe	" "
McLay, John	IIb	Lawrence, "
McLean, George E.	VIa	Lowell, "
McMahon, William A.	Vb	Lawrence, "
McNally, Edward T.	VIa	" "
McNamara, Stephen F.	I	Lowell, "
McShea, Austin H.	VIa	" "

Name	Course	Address
McWilliams, George H.	VIa	Lowell, Mass.
Michelmore, Harry	VII	No. Andover, "
Millen, Harry B.	Vb	Methuen, "
Miller, Anthony W.	VIc	West Chelmsford, "
Miller, John	IIa	Lawrence, "
Mitchell, Francis H.	VIe	Lowell, "
Montgomery, Roy J.	IV	" "
Mooney, Walter	VIb	West Chelmsford, "
Mooney, Wm. A.	VIa	Lowell, "
Moore, Francis J.	VII	Lawrence, "
Morin, John A.	Vb	Lowell, "
Morley, Arthur	IIb	Lawrence, "
Morrison, Sophia E.	VIId	Lowell, "
Mortenson, Carl W.	Vb	No. Billerica, "
Morton, Albert N.	I	Lowell, "
Mullen, Albert	VIb	" "
Mullin, James	I	" "
Mulry, Mary S.	III	Methuen, "
Murphy, Dennis F.	Vb	Lowell, "
Murphy, Frank H.	VIa	" "
Myers, James W.	VII	" "
Mystrom, Charles E.	VIa	West Chelmsford, "
Neeson, John J.	VII	Lowell, "
Nelson, Ernest H.	Va	" "
Nelson, Oscar A.	IIb	Graniteville, "
Newbold, William	VIa	West Chelmsford, "
Nichol, Samuel J.	IV	Lowell, "
Nugent, Christopher C.	VIa	" "
O'Brien, Charles J.	I	" "
O'Brien, John J.	VIa	No. Billerica, "
O'Dowd, Joseph M.	Va	Lawrence, "
O'Gorman, Joseph	VIII	Roxbury, "
O'Hara, James E.	VIa	Lowell, "
Oldread, Walter A.	VIa	" "
O'Meara, George F.	VIb	" "
O'Neill, Charles F.	IV	" "
O'Neill, James H.	VIa	" "
Orrell, Frank L.	VIb	" "
Ouelette, Germain	Vb	" "
Ouelette, Joseph C.	VIc	" "
Palmer, Thomas	III	" "
Paquin, Joseph	VIa-b	" "
Parker, Edward E.	VIII	Somerville, "
Parkinson, Royal	VIb	Lowell, "
Parsons, Joseph G.	III	" "
Pascall, Henry H.	VIa	" "
Pearson, Fred	VIa	" "
Pearson, Raymond E.	VIe	" "
Perkins, Ralph C.	III	Lawrence, "
Perkins, Thomas	I	Lowell, "
Perreault, George, Jr.	VIc	" "
Perry, Richard F.	VIa-b	Lawrence, "
Peterson, Alfred O.	IIb	" "
Petzold, Ernest R.	VIa	" "
Pihl, Christian E.	VIe	Lowell, "
Pihl, Olga E.	III	" "
Pihl, Victor E.	I	" "

Name	Course	Address
Pilkington, Charles	Vb	Lowell, Mass.
Pleau, Joseph G.	Vb	" "
Polk, Roy A.	VIa	" "
Pollard, Charles	Va	Methuen, "
Porter, George K., Jr.	VII	Dorchester, "
Porter, Jesse W.	III	No. Billerica, "
Power, James R.	VIII	Jamaica Plain, "
Powers, James	VIb	Lowell, "
Quinn, James	I	" "
Quinn, Joseph	VIa	" "
Racette, Ubald	III	" "
Ramsey, Arthur D.	I	" "
Rawnsley, Frank	VIId	" "
Read, Paul A.	VII	" "
Reardon, John S.	VIa-b	" "
Reardon, Timothy H.	VIe	" "
Redican, Michael P.	VIa	" "
Redman, H. Stewart	IV	" "
Regan, William D.	IV	" "
Reilly, Patrick	Va	" "
Reynolds, Eugene A.	VIe	" "
Reynolds, Frank T.	VIb	" "
Richardson, Arthur R.	VIe	" "
Richardson, Ralph H.	VIe	" "
Rivet, J. Douglass	VIe	" "
Roberts, Hartley	Vb	" "
Robinson, Claire M.	VIId	" "
Robinson, Edwin S.	VIa	" "
Robinson, Joseph, Jr.	III	Lawrence, "
Robinson, Walter H.	IV	Lowell, "
Rodger, Charles D.	IV	" "
Rooney, Hugh	VIa	" "
Rourke, Thomas J.	I	" "
Rousseau, Ferdinand	VIa	" "
Rowley, Herbert	III	" "
Russell, Edward F.	VIa	" "
Russell, Frank H.	VIb	" "
Russell, Frederick N.	VIb	" "
Rutledge, Wm.	III	No. Billerica, "
Ryan, Edward P.	I	Lowell, "
Rynne, John	III	" "
Salmon, Thomas J.	VIId	" "
Sanders, Richard S.	VIe	" "
Sandy, Robert	Vb	" "
Saunders, Frank W.	VIe	" "
Savage, Charles F.	I	" "
Savage, Miriam	VIId	" "
Sawyer, Albert L.	VIa	" "
Sawyer, Josephat	VIc	" "
Schofield, Hilton	Vb	" "
Schroeder, Walter A.	Vb	Lawrence, "
Schubert, Adolph C.	IIb	" "
Schubert, George J.	III	" "
Schuerfeld, Harry W.	III	Dorchester, "
Sellers, Thomas	IIb	Lawrence, "
Senior, George	Vc	Lowell, "
Shafter, Alexander E.	VIa	Dracut, "



Name	Course	Address
Shanley, Joseph E., Jr.	VIb	Lowell, Mass.
Sharpe, John R.	VIe	" "
Sheldon, Harry N.	VIb	" "
Sheridan, Michael J.	III	Lawrence, "
Shyne, John D.	VII	Lowell, "
Sidebottom, Leon W.	IV	" "
Silcox, Arthur E.	VIe	" "
Silk, Bruno	VIa	Tewksbury, "
Skinner, Clarence W.	VII	Methuen, "
Smith, Arthur	Vc	Lawrence, "
Smith, Edward C.	VIII	Somerville, "
Smith, Ernest B.	Vb	Lawrence, "
Smith, George A.	IIa	Methuen, "
Smith, James	Vb	Lawrence, "
Smith, Norman	IIa	Andover, "
Smith, Percy H.	Vb	Methuen, "
Smith, William	IIb	Lowell, "
Smith, Wm. E.	VII	Methuen, "
Snow, George A.	IV	Lowell, "
Stephens, Paul S.	VIa	" "
Stevens, Frank W.	VIe	" "
Stevens, Robert E.	IIb	Lawrence, "
Stewart, Wm. W.	IV	" "
Stott, Bertram S.	Vb	Andover, "
Stott, Charles H.	VIe	Lowell, "
Stott, Samuel	IV	Lawrence, "
Stott, Walter	III	Lowell, "
Stowell, George L.	VIc	" "
Stratton, Joseph J.	VIa	Lawrence, "
Strauss, Leon	IV	Lowell, "
Streeter, Arthur W.	VIb	" "
Sullivan, John F. A.	VIa	" "
Swanson, Anton W.	VIa	No. Billerica, "
Sweeney, Wm. F.	VIc	Lowell, "
Sykes, Alvin E.	VIa	" "
Tanner, Harry A.	III	" "
Taylor, Fred E.	IIa	" "
Tejirian, Elijah G.	III-Va	" "
Tessier, Arthur	Va	" "
Tracey, John E.	VIa	" "
Trickett, James	VIa	Lawrence, "
Trueworthy, Jessie	VIId	Lowell, "
Tucker, John T.	I	" "
Turcotte, Henry L.	VIa	" "
Turner, Charles S.	VIII	Dorchester, "
Turner, James A.	VIa	Lowell, "
Tyrrell, Robert J.	VIe	" "
Tyrrell, Walter B.	VIe	" "
Umpleby, Fenwick M.	IV	" "
Upton, Frank A.	III	" "
Varnum, Arthur C.	Vb	" "
Venne, Alfred	Va	Lawrence, "
Vincent, Wm.	VIa	Lowell, "
Vogt, Alfred	IIb	Lawrence, "
Wadsworth, Alexander H.	VII	" "
Wahlberg, Einar	I	Lowell, "
Wakeham, Robert	IIb	Lawrence, "

Name	Course	Address
Walker, James P.	IV	No. Chelmsford, Mass.
Walker, Raymond E.	IV	Lowell, "
Walsh, Wm. J.	VIe	" "
Ward, Harry J.	VIII	Dorchester, "
Ward, James J.	I Ib	Lowell, "
Ward, John J.	VIa	" "
Ware, Edward W.	III	Dorchester, "
Waterworth, Frank W.	Vb	Lawrence, "
Waterworth, William	VIa	" "
Watson, Luther F.	I Ib	Methuen, "
Webb, Wm. A.	VIe	Lowell, "
Weigel, Frederick A.	VIb	Lawrence, "
Welton, Fred H.	VIa	Lowell, "
Wentworth, Hazel M.	VId	" "
Whitehead, Alton E.	IV	" "
Whitney, Frederick A.	I-IV	" "
Wholey, Wm. P.	I	" "
Wilber, Alonzo C.	IV	" "
Willett, Wm.	I-III	Needham, "
Willgeroth, Henry J.	Vb	Lawrence, "
Williams, Wallace N.	VIe	Lowell, "
Wilson, Edward G.	VId	" "
Wilson, John	I	" "
Wilson, John J.	VIb	" "
Wilson, Ralph A.	IV	" "
Wolf, Wm. C.	Va	Lawrence, "
Worth, Lillian	VId	Lowell, "
Worth, Samuel	IV-VIe	" "
Yare, John	Vb	" "
Young, Charles S.	VIc	" "
Young, Richard, Jr.	III	" "

## SUMMARY

Day Students .....	130
Evening Students .....	625
Total .....	755
Names counted twice .....	55
Total .....	700

## DAY CLASS OF 1907.

### Graduates with Titles of Thesis

Diplomas were awarded as follows, June 6, 1907:

James Groesbeck Coman,	Cotton Manufacturing,	Lowell, Mass.
"A Comparison of the Strength and Evenness of Yarns made with Varying Doublings."		
Henry Barnes Arundale,	Wool Manufacturing, Thesis 1905.	Lawrence, Mass.
Spencer Howard Haskell,	Wool Manufacturing, Thesis with J. B. Ehrenfried. "Carbonizing Worsted Wools."	Worcester, Mass.
Harold William Hildreth,	Wool Manufacturing, Thesis 1906.	Westford, Mass.
Earl Cushing Merriman,	Wool Manufacturing, Thesis with P. W. Stursberg, "Comparison of Worsted Yarns Spun on Mules and Frames."	Shirley, Mass.
Francis Everett Storer,	Wool Manufacturing, Thesis with E. C. Woodcock. "Effect of Temperature and Humidity on Worsted Yarns Spun on the French System."	West Roxbury, Mass.
Eugene Close Woodcock,	Wool Manufacturing, Thesis with F. E. Storer.	Lawrence, Mass.
Stewart Mackay,	Designing, "Methods of Producing Figured Effects in Fabrics by the Use of Extra Warps and Fillings."	North Chelmsford, Mass.
Albert Wood Craig,	Chemistry and Dyeing, "Comparative Values of Indigo, Sulphur and Indanthrene Blues."	Lawrence, Mass.
Chester Jefferson Farmer,	Chemistry and Dyeing, "Photomicrographic Study of the Fibers."	Andover, Mass.
George Wilmer Hathorn,	Chemistry and Dyeing . "Comparison of Various Antimony Compounds as Fixing Agents for Tannic Acid."	North Andover, Mass.
Charles William Henry Hoyt,	Chemistry and Dyeing, "The Mordanting of Wool with Potassium Bichromate."	Lowell, Mass.
Daniel Power Knowland,	Chemistry and Dyeing, "The Aldehyde Derivatives of the Hydrosulphites and their Uses as Discharging and Stripping Agents."	Marblehead, Mass.
Charles Abel Raymond,	Chemistry and Dyeing, "The Artificial Retting of Flax."	Essex, Mass.
Certificates for Partial Courses were awarded as follows:		
Leon Vincent Brannen,	Designing and Weaving,	Philadelphia, Pa.
Jacob Benjamin Ehrenfried,	Woolen and Worsted Spinning and Weaving. Thesis with S. H. Haskell.	Boston, Mass.
John William Lane,	Cotton Spinning and Weaving, Thesis 1906.	Wakefield, Mass.
Lotta Meek,	Decorative Art, "Design for Tapestry on Point Paper—Field and Border."	Lowell, Mass.
Paul William Stursberg,	Woolen and Worsted Spinning and Weaving Thesis with E. C. Merriman.	New York City

## EVENING CLASS OF 1907

Certificates awarded as follows, May 8, 1907.

### COURSE I—2 YEARS. (Cotton Spinning)

John Charles Barraclough	Lawrence, Mass.
Robert Burton Gregson	Lowell, "
Ignatius Haas	" "
Harry Augustus Hamblett	" "
Henry Stewart Redman	" "
George Senior	" "
Einar Sefanias Whalberg	" "

### COURSE IIa—1 YEAR. (Woolen Spinning)

Leon Vincent Brannen	Lowell, Mass.
Charles Prescott Dodge	" "

### COURSE IIb—2 YEARS. (Worsted Spinning)

Theodore Cuyler Ackroyd	Methuen, Mass.
Frederick Wilfred Ballinger	North Chelmsford, "
James Edward Barber	" " "
Thomas William Begen	Lawrence, Mass.
Gustave John Bucklitsch	" "
John Alfred Butterworth	" "
Francis Edward Carden	Lowell, "
Ernest Berger Carlson	West Chelmsford, "
Hugo Paul Dick	Lawrence, "
Wm. Dobbs	Lowell, "
Alphonse Joseph Frechette	Lawrence, Mass.
Charles Everett Nelson	West Chelmsford, "
Michael Francis O'Brien	Lowell, "
Alfred Ernst Ritter	Lawrence, "
John Robbins	North Chelmsford, "
Thomas Whittaker	Lawrence, "

### COURSE III—3 YEARS. (Designing)

Pierre Philippe Bayard	Lowell, Mass.
Leon George Flint	Lawrence, "
Michael Henry Kelley	Lowell, "
William Frank Lake	" "
Thomas Sydney Marjerison	Lawrence, "
Williard Edgar Martin	Somerville, "
George Kingsbury Porter, Jr.	Dorchester, "
Francis Henry Webb	Lowell, "
John Francis Webber	Roxbury, "
Leon Marshall Wiggin	Lowell, "
John Joseph Wolger	Methuen, "

### COURSE IV—4 YEARS. (Chemistry and Dyeing)

Stephen Wilkinson Bastow	Nashua, N. H.
Albert Joseph Hanglin	Lowell, Mass.
Charles Louis Joseph Hebert	" "

COURSE Va—1 YEAR. (Cotton Weaving)

William Arthur Benoit	Lawrence, Mass.
Charles Arthur Butterworth	Lowell, "
Pentti Ignatius	" "
William Carl Wolf	Lawrence, "

COURSE Vb—1 YEAR. (Woolen and Worsted Weaving)

Arthur Louis Bouille	Lawrence, Mass.
Joseph Harris Burgess	" "
William Edward Hanglin	Lowell, "
Harry Scott Hitchen	North Billerica, "
Thomas Grover Hitchen	" " "
Harry Jepson	Lowell, "
Alfred Oscar Kirsch	Lawrence, "
Ernest Brice Smith	" "
James Smith	" "
Percy Hartley Smith	Methuen, "
Arthur Clayton Varnum	Lowell, "
Frank W. Waterworth	Lawrence, "
John Ferguson Yare	Lowell, "

COURSE Vc—1 YEAR. (Dobby and Jacquard Weaving)

Robert Burton Gregson	Lowell, Mass.
George Senior	" "
Arthur Smith	Lawrence, "

COURSE VII—1 YEAR. (Woolen and Worsted Finishing)

William Anderson Bain	Lowell, Mass.
Herbert Bake	Methuen, "
John J. Brouder	" "
Benjamin Duce	North Andover, "
James Edward Gillespie	" " "
John Carl Haartz	Somerville, "
John Howard	Lowell, "
August Wilhelm Laffert	Lawrence, "
Harry Michelmores	North Andover, "
James William Myers	Lowell, "
Paul Alfred Read	" "
Clarence Whittier Skinner	Methuen, "
William Edward Smith	" "

# ALPHABETICAL LIST OF GRADUATES

Name	Course	Class	Day or Evening
Abbott, Edward M.	II	1904	D
Abbott, Paul W.	I	1906	E
Adams, Henry S.	IIa	1903	E
Adams, Henry S.	I	1905	D
Adams, Michael E.	VI	1904	E
Adams, Wm. R.	IIa	1902	E
Amiot, Louis H.	Va	1906	E
Armstrong, Elias B.	IIb	1906	E
Arundale, Henry B.	II-III-V	1905	D
Aspinwall, Wm.	IIb	1901	E
Avery, Charles H.	II	1906	D
Bailey, Joseph W.	I	1899	D
Bake, Herbert	III	1905	E
Bake, Herbert	P. G. III	1906	E
Baldwin, Arthur L.	IV	1900	D
Baldwin, Frederick A.	II	1904	D
Balmforth, James H.	IIa	1903	E
Balmforth, James H.	IIa-b	1904	E
Balmforth, Wm. F.	VI	1904	E
Balmforth, Martha B.	(See French)		
Barker, John P.	V	1904	E
Barlow, Robert	V	1902	E
Barr, I. Walwin	I	1900	D
Barrington, John A.	IV	1904	E
Barry, Edward J.	III	1903	E
Bastow, Henry	III	1903	E
Bastow, Henry	V	1905	E
Baxter, Alvah J.	IIa	1903	E
Bell, Frederick W.	IIa	1905	E
Bennett, Edward H.	V	1903	D
*Berry, Frank M.	III	1899	E
*Berry, Frank M.	V	1901	E
Binns, Heaton	II-V	1899	E
Binns, Heaton	VI	1902	E
Bloom, Wilfred N.	IV	1903	D
Bodwell, Henry A.	II	1900	D
Boucher, John L.	VI	1904	E
Bowie, Samuel A.	VI	1905	E
Bowring, George P. B.	VI	1902	E
Boyd, George A.	I	1905	D
Bradford, Roy H.	II	1906	D
Bradley, Richard H.	V	1901	D
Brainerd, Irving L.	I	1902	E
Brickett, Chauncey J.	II	1900	D
Broadbent, James T.	I	1899	E
Brooks, Noah	III-V	1901	E
Brouder, John J.	III	1906	E
Brown, James P.	III	1905	E
Brown, James P.	P. G. III	1906	E
Brown, Wm. G.	IIb	1906	E
Bryant, Ernest L.	VI	1905	E
Buchan, Donald C.	II	1901	D
Burgess, Joseph H.	Va	1906	E
Burghardt, Edward S.	IIa	1902	E

\*Deceased



Name	Course	Class	Day or Evening
Burghardt, Paul C.	IIa	1901	E
Burke, Thomas F.	I	1905	E
Burnham, Frank E.	IV	1902	D
Burnham, Joseph W.	III	1906	E
Burnham, Wilmont V.	Vb	1906	E
Burns, Edward J.	IV	1905	E
Burns, James E.	IV	1905	E
Burrage, Katherine C.	IIIb	1899	D
Burrage, Katherine C.	P. G. IIIb	1900	D
Butler, Benj. O.	VI	1904	E
Buzzell, Wm. O.	III	1901	E
Buzzell, Wm. O.	P. G. III	1902	E
Byam, Walter S.	VI	1903	E
Cady, Dennis J.	V	1903	E
Callahan, Patrick A.	VI	1904	E
Campbell, Albert D.	IIb	1900	E
Campbell, Laura E.	IIIb	1900	D
Campbell, Louise P.	IIIb	1903	D
Campbell, Orison S.	II	1903	D
Caron, Cleophas	I	1905	E
Carr, George E.	I	1905	D
Carter, Robert A.	IV	1902	D
Cawthra, Albert B.	IIb	1900	E
Chamberlin, Frederick E.	I	1903	D
Cheetham, John James	III	1901	E
Cheetham, John James	P. G. III	1902	E
Cheetham, John Joseph	I	1904	E
Chippindale, Ernest W.	IIb	1901	E
Church, Charles R.	II-V	1906	D
Churchill, Charles W.	III	1906	D
Clapp, F. Austin	II	1904	D
Clogston, Raymond B.	IV	1904	D
Colby, Arthur D.	I	1900	E
Cole, Edward E.	IV	1906	D
Cole, James T.	II	1905	D
Collier, John	III	1899	E
Collier, John	P. G. III	1902	E
Collins, John A.	IIa-b	1905	E
Conklin, Jennie G.	IIIb	1905	D
Conley, Frederick A.	VI	1904	E
Connors, Edward F.	VI	1904	E
Cook, Cheney E.	III	1905	E
Cowdell, Herbert	V	1901	E
Cowdrey, Charles E.	V	1902	E
Craig, Clarence E.	III	1902	D
Cremin, Daniel J.	I	1902	E
Crompton, Henry H.	II	1899	E
Culver, Ralph F.	IV	1904	D
Curran, Charles E.	II-III-V	1902	D
Currier, Herbert A.	I	1906	D
Currier, John A.	II	1901	D
Curtis, Frank M.	I	1906	D
Curtis, William L.	II	1905	D
Custer, James J. E.	V	1905	E
Cutler, Benj. W., Jr.	III	1904	D
Cuttle, James H.	II	1899	D

Name	Course	Class	Day or Evening
Dana, Clarence A.	VI	1905	E
Davis, Henry	IIb	1901	E
Davis, Prentice T.	I	1904	E
Delmage, Edward R.	III	1904	E
Dempsey, John W.	IIa	1904	E
Dewey, James F.	II	1904	D
Dick, Hugo P.	III	1905	E
Dick, Hugo P.	P. G. III	1906	E
Dickson, Andrew	IIa	1906	E
Dillon, James H.	III	1905	D
Dimlick, Benj. C.	III	1905	E
Dimlick, Benj. C.	P. G. III	1906	E
Dodge, Frank	I	1906	E
Donahue, Michael F.	VI	1904	E
Donald, Albert E.	II	1904	D
Donnellan, Frank T.	IIa	1902	E
Donnellan, Frank T.	V	1903	E
Donnelly, James	I	1900	E
Donovan, Daniel F.	IIa	1901	E
Doole, George L.	VI	1904	E
Dooley, Edward W.	VI	1904	E
Duce, Benj.	III	1906	E
Dudley, George E.	I	1902	E
Duggan, Francis P.	VI	1904	E
Ellis, George W.	VII	1906	E
Elston, Fred R.	III	1900	E
Emerson, Frank W.	II	1903	D
Erbe, Gustave	VI	1905	E
Evans, Alfred W.	III	1903	D
Evans, William R.	III	1903	D
Evison, William A.	V	1901	E
Ewer, Nathaniel T.	IV	1901	D
Eyers, John T.	IV	1906	E
Farrell, Thomas	IIa	1901	E
Fels, August B.	II	1899	D
Ferguson, Arthur F.	I	1902	D
Ferguson, Arthur F.	I	1903	D
Ferguson, Thomas	V	1902	E
Field, Charles W.	VI	1902	E
Fleming, Frank E.	IV	1906	D
Flynn, John J.	VI	1903	E
Forrest, Fred G.	IIa	1902	E
Fortune, David A.	IIb	1902	E
Foster, Clifford E.	II	1901	D
Foster, Sherwood L.	I	1905	E
Frame, William	V	1901	E
Frank, Emil M.	III	1904	E
Frank, Emil M.	P. G. III	1906	E
French, Ernest J.	I	1905	E
French, Martha Balmforth	III	1903	E
Fuller, George	I	1903	D
Fuller, John M.	V	1906	E
Gagan, John H.	V	1901	E
Gahm, George L.	II	1906	D
Garner, William	III	1903	E

Name	Course	Class	Day or Evening
Gaunt, Alfred C.	III	1899	E
Gaunt, Alfred C.	P. G. III	1902	E
Gaunt, Alfred C.	IIa	1903	E
Gaunt, Alfred C.	IIb	1904	E
Gay, Earle B.	I	1905	E
Gerrish, Walter	III	1903	D
Gillon, Sara A.	IIIb	1906	D
Good, Henry	I	1902	E
Goodchild, George	I	1903	E
Goodchild, George	VI	1905	E
Goodhue, Amy H. (see Harrison)			
Grant, Archibald	IIb	1901	E
Gray, Finley M.	VI	1903	E
Gregson, Robert B.	Va	1906	E
Grouke, Michael	IIb	1901	E
Haigh, Walter,	III	1902	E
Haigh, William	Vb	1906	E
Halsell, Elam R.	I	1904	D
Harder, Elmer E.	VI	1905	E
Harmon, Charles F.	I	1899	D
Harriman, Henry I.	V	1899	D
Harris, Charles E.	I	1905	D
Harris, George S.	I	1902	D
Harrison, Amy Goodhue	IIIb	1900	D
Harrison, Amy Goodhue	P. G. IIIb	1901	D
Hartweil, Henry E.	VI	1906	E
Haskell, Walter F.	IV	1902	D
Hastings, Walter M.	I	1899	D
Haven, George W.	III	1905	E
Haworth, Joseph	VI	1902	E
Hempel, Frank	V	1904	E
Hennigan, Arthur J.	II	1906	D
Higgins, James A.	IIa	1903	E
Higgins, James A.	IIa-b	1904	E
Hildreth, Harold W.	II-V	1906	D
Hill, Daniel	IIb	1901	E
Hintze, Thomas F.	I	1906	D
Hitchcock, Thomas B.	I-IIa-III	1901	E
Hoessler, Carl, Jr.	III	1906	E
Hogan, James A.	V	1902	E
Holgate, Benj.	III	1902	D
Holgate, Benj.	V	1903	D
Holgate, Charles H.	IIa	1901	E
Hollings, James L.	I	1905	D
Hook, Russell W.	IV	1905	D
Horsfall, George G.	II-III-V	1904	D
Howard, John	V	1900	E
Howard, John	III	1903	E
Howard, John	IIa	1906	E
Howard, Thomas	V	1905	E
Hoyle, Edward	IIb	1902	E
Hoyle, Joseph	IIb	1904	E
Hunt, Chester L.	III	1905	D
Hunt, Herbert R.	VI	1905	E
Hunter, Ralph	III	1901	E
Hunter, Ralph	V	1903	E

Name	Course	Class	Day or Evening
Huntou, Lewis G.	IV	1905	E
Hutton, Clarence	V	1900	E
Hutton, Clarence	III	1903	D
Hutton, Harold	V	1906	E
Hutton, John M.	Vb	1906	E
Inberg, Magnus	I	1906	E
Jeannotte, Arthur	VI	1904	E
Jennings, James J.	III	1903	E
Johnson, Ernest A.	IIa-b	1902	E
Johnson, Ernest A.	V	1906	E
Johnson, Samuel L.	V	1903	E
Jones, Everett A.	II	1904	D
Jones, Everett A.	III	1905	D
Jones, William J.	IIb	1900	E
Jones, William J.	IIa	1901	E
Jury, Alfred E.	IV	1904	D
Keleher, John J.	IIb	1903	E
Kellett, Irvine	II	1899	E
Kelley, Michael H.	I	1902	E
Kent, Clarence L.	III-V	1906	D
Kent, Ernest J.	IIb	1902	E
Kenworthy, Joseph	I	1905	E
Kershaw, William E.	V	1904	E
Kidd, Thomas E.	IV	1906	E
Killerby, Walter	IIb	1901	E
Kimball, Irving D.	VI	1905	E
Kingsbury, Percy F.	IV	1901	D
Knowles, Frank E.	I	1903	E
Laffert, August W.	III	1906	E
Lakeman, Fannie S.	IIIb	1900	D
Lamont, Walter M.	IIb	1902	E
Lamson, George F.	I	1900	D
Lamson, George F.	VI	1905	E
Lane, John W.	I	1906	D
Langevin, Felix D.	VI	1904	E
Law, Alfred	IIb	1901	E
Lawliss, Augustine J.	V	1902	E
Lawrence, Charles	I	1903	E
Leach, John P.	I-V	1900	D
Leach, Joseph W.	V	1903	E
Lee, Charles	I	1902	E
Lee, William H.	V	1905	D
Leith, Edwin E.	III	1902	E
Lewis, Walter S.	IV	1905	D
Libby, C. Robert	VI	1902	E
Lincourt, Hector L.	VI	1903	E
Linkletter, Alfred C.	VI	1905	E
Lord, Harry D.	III	1904	E
Lord, Wilfred	III	1901	E
Lord, Wilfred	IIb	1903	E
Lord, Wilfred	IIa	1904	E
Lovell, Charles E.	VI	1905	E
Lucey, Edmund A.	II	1904	D
Mackay, Rowland N.	I	1899	D
MacPherson, Wallace A.	III	1904	D
Maden, Harry	IIb	1900	E

Name	Course	Class	Day or Evening
Maguire, James H.	VI	1905	E
Maguire, James H.	I	1906	E
Marjerison, Isaiah D.	II	1899	E
Marinel, Walter N.	I	1901	D
Martin, John C., Jr.	IIa-b	1905	E
Mason, Frederick A.	I	1903	E
McAlister, John W.	V	1899	E
McBride, Robert G.	IIa	1904	E
McCarthy, Joseph F.	III	1906	E
McDonnell, William H.	I-V	1906	D
McKenna, Hugh F.	IV	1905	D
McLaughlin, Peter J.	I	1906	E
McLay, John	Vb	1906	E
McManus, Hugh	V	1905	E
McQuade, Hugh B.	V	1901	E
Meadows, William R.	I	1904	D
Merchant, Edith C.	IIIb	1900	D
Merrill, Edwin C.	VI	1904	E
Michelmore, Harry	III	1906	E
Midwood, Arnold J.	IV	1905	D
Miller, Emil H.	V	1904	E
Minge, Jackson C.	I-V	1901	D
Minge, Jackson C.	III	1901	E
Moir, Alexander L.	III	1899	E
Moir, Alexander L.	P. G. III	1903	E
Molloy, Andrew	V	1902	E
Molloy, Andrew	III	1905	E
Molloy, Andrew	P. G. III	1906	E
Moore, Everett B.	I	1905	D
Moorehouse, Thomas	VI	1904	E
Moorehouse, William R.	IV	1901	D
Morris, Frank A.	V	1901	E
Morrison, Fred C.	I	1903	D
Mortenson, Carl W.	III	1903	E
Morton, Albert N.	IIb	1906	E
Mozley, Arthur	VI	1903	E
Murphy, Cornelius D.	IIa	1906	E
Murphy, John H.	VI	1904	E
Myers, James W.	III-IV	1903	E
Najarian, Garabed	IV	1903	D
Nelson, Ernest H.	IIb	1900	E
Nelson, Ernest H.	IIa	1901	E
Nelson, Ernest H.	III	1906	E
Newcomb, Guy H.	IV	1906	D
Nicholson, Richard	IIb	1903	E
Noble, John T.	V	1899	E
Noble, John T.	III	1901	E
Noonan, Denis T.	III	1903	E
Notman, Frederick W.	I	1904	E
Nugent, Thomas A.	II-V	1899	E
Nugent, Thomas A.	VI	1902	E
O'Brien, David A.	IV	1906	E
O'Donnell, John D.	I	1904	D
Ogley, Samuel A.	IIb	1900	E
O'Hara, William F.	IV	1904	D
O'Neill, Peter F.	IV	1905	E

Name	Course	Class	Day or Evening
Osgood, Charles F.	I	1900	E
Osgood, Charles F.	VI	1902	E
Overend, John	V	1905	E
Palmer, G. Buel	III	1903	E
Parker, B. Moore	I	1901	D
Parker, Everett N.	I	1904	D
Parker, Everett N.	I	1905	D
Parker, Harry C.	V	1900	D
Patrick, Alexander	III	1904	E
Pedler, William A.	I	1906	E
Peel, Hudson	IIb	1901	E
Perkins, John E.	III	1900	D
Petty, George E.	I-V	1903	D
Pihl, Christian E.	VI	1906	E
Pittendreigh, John M.	I	1906	E
Potter, Richard W.	V	1902	E
Pradel, Alois J.	III	1900	D
Pradel, Anna Walker	IIIb	1903	D
Pratt, Albert S.	I	1901	D
Ramsdell, Theodore E.	I	1902	D
*Rasche, William A.	III	1903	D
Reardon, Timothy H.	VI	1906	E
Redman, Henry S.	III	1904	E
Redman, Henry S.	V	1905	E
Reed, Foster C. K.	VI	1904	E
Reynolds, Eugene A.	VI	1906	E
Reynolds, Hiram L.	III	1901	E
Reynolds, Isabel H.	III-V	1903	D
Reynolds, Isabel H.	P. G. III-V	1906	D
Rhodes, Joseph E.	V	1904	E
Richards, Francis G.	IIa	1906	E
Roberson, Pat H.	I	1905	D
Roberts, Carrie I.	IIIb	1905	D
Robinson, William C.	III-V	1903	D
Rockwell, Henry D.	IIa	1903	E
Rockwell, Samuel F.	IIa	1902	E
Kooney, George W.	I	1904	E
*Rowell, Herman C.	I-IIb	1900	E
Rushworth, Walter	VI	1906	E
Saunders, Edward B.	III	1901	E
Scanlon, Edward J.	IIb	1901	E
Schermerhorn, George E.	I	1902	E
Schofield, John S.	III	1903	E
Schoon, Fenton	IIb	1903	E
Schubert, George J.	V	1906	E
Senior, George	Va	1906	E
Shannon, Philip J.	V	1901	E
Sharpe, John R.	VI	1906	E
Shaw, James	V	1904	E
Sheppard, Byron H.	VI	1906	E
Silcox, Arthur E.	I	1900	E
Silk, Frederick C. M.	IV	1905	E
Silk, Patrick E.	VII	1906	E
Simola, Emil J.	IIa-b	1905	E
Skinner, Clarence W.	III	1905	E
Skinner, Clarence W.	P. G. III	1906	E

\*Deceased



Name	Course	Class	Day or Evening
Sleeper, Robert R.	IV	1900	D
*Smith, Albert A.	I	1899	D
Smith, Arthur	III	1905	E
Smith, Arthur	P. G. III	1906	E
Smith, Arthur	Va	1906	E
Smith, Edward	I	1904	E
Smith, Fred	IIb	1901	E
Smith, George A.	III	1905	E
Smith, George A.	P. G. III	1906	E
Smith, John W.	IIb	1904	E
Smith, Ralston F.	I	1904	D
Smith, Stephen E.	I	1900	D
Smith, William E.	III	1905	E
Smith, William E.	P. G. III	1906	E
Smith, William H.	IIb	1902	E
Snelling, Fred N.	II	1903	D
Snow, Fred L.	IV	1900	E
Spedding, Ephraim H.	III	1899	E
Spiegel, Edward	V	1903	D
Sterling, Walter	III	1904	E
Stevens, Dexter	I	1904	D
Stevens, Frank W.	VI	1905	E
Stevenson, Murray R.	III-V	1903	D
Stevenson, William	II	1899	E
Stevenson, William	III	1902	E
Stewart, Arthur A.	II	1900	D
Stewart, Walter L.	III	1903	D
Stockham, Burton I.	IV	1903	E
Stockham, Burton I.	P. G. IV	1904	E
Stohn, Alexander C.	III-V	1906	D
Stopherd, William H.	II-V	1899	E
Stopherd, William H.	VI	1902	E
Stopherd, William H.	III	1905	E
Stopherd, William H.	P. G. III	1906	E
Swan, Guy C.	II	1906	D
Swift, Edward S.	V	1899	E
Swift, Edward S.	I	1901	E
Swift, Edward S.	I	1902	D
Syme, James F.	II	1900	D
Tarpey, John F.	IIa	1904	E
Thomas, Roland V.	I	1905	D
Thompson, Charles B.	VI	1904	E
Thompson, Everett L.	I	1905	D
Thompson, Henry J.	IV	1900	D
Tilton, Elliott T.	II	1899	D
Tonge, John	IV	1905	E
Tonge, Matthew	III	1903	E
Toovey, Sidney E.	V	1904	D
Umpleby, Thomas B.	V	1902	E
Upton, Frank A.	I	1903	E
Varney, Manley H.	III	1902	E
Varney, Manley H.	I	1903	E
Varnum, Arthur C.	II	1906	D
Vogt, Alfred H.	III	1902	E
Vogt, Harry A.	Vb	1906	E
Walker, Anna G. (See Pradel)			

\*Deceased

Name	Course	Class	Day or Evening
Walker, David	III	1902	E
Walker, David	P. G. III	1903	E
Walker, William, Jr.	VII	1906	E
Ward, James J.	VII	1906	E
Wardrobe, William L.	I	1900	D
Warren, Philip H.	II	1905	E
Waterhouse, Joseph	IV	1900	E
Webb, Francis H.	V	1904	D
Webb, Frank H.	IV	1904	D
Webber, Arthur H.	IV	1901	E
Wesson, Paul B.	I	1901	D
Wheelock, Stanley H.	II	1905	E
*Whitcomb, Harry E.	I	1906	D
White, Royal P.	II	1904	E
Whitehead, Bennett	IIb	1901	D
Wightman, William H.	IV	1906	E
Wilde, Thomas E.	IIa	1905	E
Willey, Frank S.	I	1901	E
Williamson, Isaac F.	IV	1901	E
Wilmot, William	III	1899	E
Wilson, Calvin E.	IIb	1902	E
Wilson, George H.	IIb	1902	D
Wilson, John S.	II	1903	D
Wilson, Walter E. H.	I	1904	E
Wilton, George H.	III	1899	E
Wing, Charles T.	III	1900	D
Wing, Charles T.	III	1902	D
Wise, Paul T.	II	1901	E
Wiswall, Frank T.	V	1905	D
Wood, Herbert C.	I	1906	E
Wood, Jonathan	I	1902	E
Woodbury, W. Sanford	I	1900	D
Woodies, Ida A.	IIIb	1900	D
Woodies, Ida A.	P. G. IIIb	1901	D
Woodman, Harry L.	I-III-V	1902	D
Woodruff, Charles B.	V	1906	D
Wright, Edward, Jr.	II	1905	D

\*Deceased

## LIST OF PAST STUDENTS

- (C) Indicates Certificate, Partial Course.  
 (D) Indicates Diploma, Complete Course.  
 (P. G.) Indicates Post Graduate Course.  
 (x) Indicates Last Known Address.  
 (\*) Deceased.

### Day Course, 1899.

Name	Course	Occupation
Bailey, Joseph W.	I D	Principal, Bradford-Durfee Textile School, Fall River, Mass.
Burrage, Katherine C.	IIIb C	Teacher, Evening Drawing School, Lowell, Mass.
Cuttle, James H.	II D	Designer, Harding, Whitman and Co., New York City.
Fels, August B.	II D	With Harding, Whitman and Co., Boston, Mass.
Harmon, Charles F.	I D	In business, Lowell Mass.
Harriman, Henry I.	V	With Geo. W. Stafford Co., Readville, Mass.
Hastings, Walter M.	I	Asst. to Agent, Arlington Mills, Lawrence, Mass.
Mackay, Rowland N.	I	Selling Agent, Geo. W. Stafford Co., Readville, Mass.
*Smith, Albert A.	I D	
Tilton, Elliott T.	II D	Electrician, General Electric Co., Boston, Mass.

### Evening Course, 1899.

*Berry, Frank M.	III C	
Binns, Heaton	II-V C	Amsterdam, N. Y.
Broadbent, James T.	I C	Instructor Carding and Spinning, Bradford-Durfee Textile School, Fall River, Mass.
Collier, John	III C	Superintendent, Knoxville Woolen Mills, Knoxville, Tenn.
Crompton, Henry H.	II C	Instructor, Lowell Textile School, Lowell, Mass.
Gaunt, Alfred C.	III C	Treasurer, Tremont Worsted Co., Methuen, Mass.
Kellett, Irvine	II C	Second Hand Worsted Spinning, Lower Pacific Mills, Lawrence, Mass.
Marjerison, Isaiah D.	II C	Second Hand, Arlington Top Mills, Lawrence, Mass.
McAlister, John W.	V C	Vice-President, Home Real Estate Loan and Insurance Co., Winston-Salem, N. C.
Moir, Alexander L.	III C	Letter Carrier, Lowell, Mass.
Noble, John T.	V C	Bigelow Carpet Co., Lowell, Mass.
Nugent, Thomas A.	II-V C	Overseer Worsted Spinning, Bigelow Carpet Co., Lowell, Mass.
Spedding, Ephraim H.	III C	Second Hand, Tremont and Suffolk Mills, Lowell, Mass.

Name	Course	Occupation
xStevenson, Wm.	II C	Supt. Franklin Woolen Mills, Franklin, Ky.
Stopherd, William H.	II-V C	Overseer Worsted Spinning, Bigelow Carpet Co., Lowell, Mass.
Swift, Edward S.	V C	Cotton Yarn Salesman, Catlin and Co., Boston, Mass.
Wilmot, William	III C	Designer, Hamilton Webb Co., Hamilton, R. I.
Wilton, George H.	III C	Overseer, M. T. Stevens and Sons Co., Andover, Mass.

### Day Course, 1900.

Baldwin, Arthur L.	IV D	Chemist, Lowell, Mass.
Barr, I. Walwin	I D	Designer, Lawrence and Co., New York City.
Bodwell, Henry A.	II D	Supt., Smith and Dove Mfg. Co., Andover, Mass.
Brickett, Chauncey J.	II D	Asst. Prin., International Correspondence School, New Bedford, Mass.
Burrage, Katherine C. P. G.	IIIb C	See Day Course, 1899.
Campbell, Laura E.	IIIb C	Designer, Lowell, Mass.
xHarrison, Mrs. Amy H. (Goodhue)	IIIb C	Dracut, Mass.
Lakeman, Fannie S.	IIIb C	Designer, Salem, Mass.
Lamson, George F.	I D	Draughtsman, Arlington Mills, Lawrence, Mass.
Leach, John P.	I-V C	Foreman, Harriet Cotton Mills, Henderson, N. C.
Merchant, Edith C.	IIIb C	Designer, Lowell, Mass.
Parker, Harry C.	V C	In business, Franklin, N. H.
Perkins, John E.	III D	Asst. Supt., S. N. and C. Russell Mfg Co., Pittsfield, Mass.
Pradel, Alois J.	III D	Designer, Montrose Mills, Woonsocket, R. I.
Sleeper, Robert R.	IV D	Instructor in Dyeing, Lowell Textile School, Lowell Mass.
Smith, Stephen E.	I D	Head Instructor, Cotton Dept., Lowell Textile School, Lowell, Mass.
Stewart, Arthur A.	II D	Head Instructor, Finishing, Lowell Textile School, Lowell, Mass.
Syme, James F.	II D	Of H. T. Murdock and Co., Proctorsville, Vt.
Thompson, Henry J.	IV D	Dyer, Boston Rubber Shoe Co., Malden, Mass.
Woodies, Ida A.	IIIb C	Designer, Lowell, Mass.

### Evening Course, 1900.

Campbell, Albert D.	Iib C	Section Hand, Worsted Drawing, Arlington Mills, Lawrence, Mass.
Cawthra, Albert B.	Iib C	Overseer, Cranston Worsted Mills, Bristol, R. I.
Colby, Arthur D.	I C	Draughtsman, Lowell Machine Shop, Lowell, Mass.
Donnelly, James	I C	Second Hand, Mule Room, Stark Mill No. 6, Manchester, N. H.

Name	Course	Occupation
Elston, Fred R.	III C	Designer, Puritan Mills, Plymouth, Mass.
Howard, John	V C	Overseer of Weaving, Belvidere Woolen Co., Lowell, Mass.
Hutton, Clarence	V C	Circulation Manager, Textile World Record, Boston, Mass.
Jones, William J.	IIb C	Overseer, Worsted Spinning, U. S. Bunting Co., Lowell, Mass.
Maden, Harry	IIb C	Overseer, Worsted Spinning, Walsh's Mill, Lowell, Mass.
Nelson, Ernest H.	IIb C	Pattern Weaver, Mass Cotton Mills, Lowell, Mass.
Ogley, Samuel A.	IIb C	Overseer, Worsted Spinning, G. C. Moore Co., No. Chelmsford, Mass.
Osgood, Charles F.	I C	Draughtsman, Library Bureau, Boston, Mass.
*Rowell, Herman C.	I-IIb C	
Silcox, Arthur E.	I C	Draftsman, Lowell Machine Shop, Lowell, Mass.
Snow, Fred L.	IV C	Bleacher and Dyer, Lawrence Mfg. Co., Lowell, Mass.
xWardrobe, Wm. L.	I C	Lowell, Mass.
xWaterhouse, Joseph	IV C	Section Hand, Merrimack Print Works, Lowell, Mass.
Wing, Charles T.	III C	Asst. Supt., Middlesex Mfg. Co., Lowell, Mass.
Woodbury, W. Sanford	I C	Overseer Carding, Dana Warp Mills, Westbrook, Me.

#### Day Course, 1901.

Bradley, Richard H.	V C	Overseer, Hewitt Rubber Co., Buffalo, N. Y.
Buchan, Donald C.	II D	With Wood Worsted Mills, Lawrence, Mass.
Currier, John A.	II D	Asst. Supt., M. T. Stevens and Sons Co., Haverhill, Mass.
Ewer, Nathaniel T.	IV D	Chemist, American Dyewood Co., Chester, Pa.
Foster, Clifford E.	II D	Asst. to Supt., Beaver Brook Mills, Collinsville, Mass.
xHarrison, Mrs. Amy H. P.G. (Goodhue)	IIIb C	See Day, 1900.
Kingsbury, Percy F.	IV D	Asst. Color Maker, Merrimack Mfg. Co., Lowell, Mass.
Marinel, Walter N.	I D	Draftsman, Fore River Ship Building Co., Quincy, Mass.
Minge, Jackson C.	I-V C	Sec.-Treas., Minge Mfg. Co., Demopolis, Ala.
Moorhouse, William R.	IV D	Chemist, Cassella Color Co., Boston, Mass.
Parker, B. Moore	I D	Instructor, Carding and Spinning, A. and M. College, West Raleigh, N. C.
Pratt, Albert S.	I	Agent, Edwards Mfg. Co., Augusta, Me.
Webber, Arthur H.	IV D	Chemist, F. E. Atteaux and Co., Boston, Mass.
Wise, Paul T.	II D	Supt., Dearnley Worsted Spinning Co., Philadelphia, Pa.

Name	Course	Occupation
Woodies, Ida A.	P. G. IIIb C	See Day, 1900.

### Evening Course, 1901.

Aspinwall, William	IIb C	Overseer Drawing, Southwark Mills, Philadelphia, Pa.
*Berry, Frank M.	V C	Lowell, Mass.
xBrooks, Noah	III-V C	Second Hand, Card Room, Merrimack Woolen Co., Lowell, Mass.
xBurghardt, Paul C.	IIa C	Third Hand, Dartmouth Mfg. Corp., New Bedford, Mass.
Buzzell, William O.	III C	Spindle Setter, Mass. Cotton Mills., Lowell, Mass.
Cheetham, John James	III C	Section Hand, Combing, Moore Spinning Co., No. Chelmsford, Mass.
Chippindale, Ernest W.	IIb C	Loomfixer, Hamilton Mfg. Co., Lowell, Mass.
Cowdell, Herbert	V C	Overseer, Hudson Worsted Co., Hudson, Mass.
Davis, Henry	IIb C	Second Hand, Woolen Carding, Yonkers, N. Y.
xDonovan, Daniel F.	IIa C	Loomfixer, Prescott Mills, Lowell, Mass.
Evison, William A.	V C	Woolen Spinner, Stirling Mills, Lowell, Mass.
Farrell, Thomas	IIa C	Overseer, Johnson & Johnson, New Brunswick, N. J.
xFrame, William	V C	Overseer, Stirling Mills, Lowell, Mass.
Gagan, John H.	V C	Section Hand, Spinning, Bigelow Carpet Co., Lowell, Mass.
Grant, Archibald	IIb C	Section Hand, Brussels Dept., Bigelow Carpet Co., Lowell, Mass.
Groucke, Michael	IIb C	Overseer, Worsted Spinning, Maine Alpaca Co., Sanford, Me.
Hill, Daniel	IIb C	Publishing, Grafton Press, New York City.
Hitchcock, Thomas B.	I-IIa-III C	Manager, Selmar Hess, New York City.
Holgate, Charles H.	IIa C	Salesman, Hall, Hartwell and Co., Troy, N. Y.
Hunter, Ralph	III C	See Evening, 1900.
Jones, William J.	IIa C	Overseer, Park Worsted Mill, Lowell, Mass.
Killerby, Walter	IIb C	Section Hand, Worsted Combing, Arlington Mills, Lawrence, Mass.
Law, Alfred	IIb C	Inspector, Textile Fabrics, U. S. Government, New York City.
Lord, Wilfred	III C	Loomfixer, Bigelow Carpet Co., Lowell, Mass.
McQuade, Hugh B.	V C	See Day 1901.
Minge, Jackson C.	III C	Loomfixer, Standish Worsted Co., Plymouth, Mass.
Morris, Frank A.	V C	See Evening 1900.
Nelson, Ernest H.	IIa C	See Evening 1899.
Noble, John T.	III C	Second Hand, Worsted Spinning, Arlington Mills, Lawrence, Mass.
Peel, Hudson	IIb C	Supt., Saunders Cotton Mills, Saundersville, Mass.
Reynolds, Hiram L.	III C	



Name	Course	Occupation
xSaunders, Edward B.	III C	In business, Fall River, Mass.
Scanlon, Edward J.	IIb C	In business, Lawrence, Mass.
Shannon, Philip J.	V C	Loomfixer, Belvidere Woolen Mills, Lowell, Mass.
Smith, Fred	IIb C	Overseer, Worsted Spinning, Wood Worsted Mills, Lawrence, Mass.
Swift, Edward S.	I C	See Evening, 1899.
Wesson, Paul B.	I C	Foreman, Lowell Machine Shop, Lowell, Mass.
Whitehead, Bennett	IIb C	Second Hand, Worsted Spinning, Arlington Mills, Lawrence, Mass.
Wiley, Frank S.	I C	Second Hand, Carding, Upper Pacific Mills, Lawrence, Mass.
Williamson, Isaac F.	IV C	Asst. Dyer, Hamilton Print Works, Lowell, Mass.

### Day Course, 1902.

Burnham, Frank E.	IV D	Chemist, Avery Chemical Co., Littleton, Mass.
Carter, Robert A.	IV D	Textile chemist and expert, Roessler & Hasslacher Chemical Co., New York City.
Craig, Clarence E.	III D	Auditor, Meriden Creamery Co., Kansas City, Mo.
Curran, Charles E.	II-III-V C	Head Designer, Wood Worsted Mills, Lawrence, Mass.
Ferguson, Arthur F.	I C	Instructor, Design Dept., Lowell Textile School, Lowell, Mass.
Harris, George S.	I C	Supt., Sycamore Mills, Sycamore, Ala.
Haskell, Walter F.	IV D	Overseer of Dyeing, Dana Warp Mills, Westbrook, Me.
Holgate, Benj.	III C	Cost Accountant, Boott Mills, Lowell, Mass.
Ramsdell, Theodore E.	I D	Agent, Monument Mills, Housatonic, Mass.
Swift, Edward S.	I D	See Evening, 1899 and 1901.
Wing, Charles T.	III D	See Evening, 1900.
Woodman, Harry L.	I-III-V C	Asst. to Supt., Mass. Cotton Mills, Lowell, Mass.

### Evening Course, 1902.

xAdams, Wm. R.	IIa C	Pressman, Stevens Mills, No. Andover, Mass.
Barlow, Robert	V C	Twister, Belvidere Woolen Mill No. 1, Lowell, Mass.
Binns, Heaton	VI C	See Evening, 1899.
Bowring, George P. B.	VI C	Machinist, Lowell Machine Shop, Lowell, Mass.
xBrainerd, Irving L.	I C	Overseer, Carding, W. L. Barrell and Co., Lawrence, Mass.
xBurghardt, Edward S.	IIa C	Lawrence, Mass.
Buzzell, Wm. O.	P. G. III C	See Evening, 1901.
Cheetham, John James	P. G. III C	See Evening, 1901.
Collier, John	P. G. III C	See Evening, 1899.
xCordrey, Charles E.	V C	Pattern Weaver, Talbot Mills, No. Billerica, Mass.
xCremin, Daniel J.	I C	Second Hand, Boott Mills, Lowell, Mass.

Name	Course	Occupation
Donnellan, Frank T.	IIa C	Percher, Chicago, Ill.
xDudley, George E.	I C	Third Hand, Carding, Mass. Mills, Lowell, Mass.
Ferguson, Thomas	V C	Second Hand, Appleton Co., Lowell, Mass.
xField, Charles W.	VI C	Draftsman, C. F. Morrill, Somerville, Mass.
xForrest, Fred G.	IIa C	Finishing Room, Middlesex Co., Lowell, Mass.
Fortune, David A.	IIb C	Section Hand, Worsted Spinning, Lower Pacific Mills, Lawrence, Mass.
Gaunt, Alfred C.	P. G. III C	See Evening 1899.
Good, Henry	I C	Providence, R. I.
xHaigh, Walter	III C	U. S. Bunting Co., Lowell, Mass.
xHaworth, Joseph	VI C	Machinist, Claremont, N. H.
xHogan, James A.	V C	Lowell, Mass.
Hoyle, Edward	IIb C	Supt., Moore Spinning Co., No. Chelmsford, Mass.
Johnson, Ernest A.	IIa-b C	Asst. Supt., Washington Mills, Lawrence, Mass.
Kelley, Michael H.	I C	Second Hand, Appleton Co., Lowell, Mass.
Kent, Ernest J.	IIb C	Section Hand, Worsted Spinning, Lower Pacific Mills, Lawrence, Mass.
Lamont, Walter M.	IIb C	Supt., Worsted Yarn Dept., Wood Worsted Mill, Lawrence, Mass.
Lawliss, Augustine J.	V C	Overseer Weaving, Belvidere Woolen Co., Lowell, Mass.
Lee, Charles	I C	Machinist, Lowell Machine Shop, Lowell, Mass.
Leith, Edwin E.	III C	Supt., Franklin Woolen Mills, Franklin, Ky.
Libby, C. Robert	VI C	Engineering Dept., Lamson Consolidated Store Service Co., Lowell, Mass.
Molloy, Andrew	V C	Overseer of Spooling, Tremont and Suffolk Mills, Lowell, Mass.
Nugent, Thomas A.	VI C	See Evening, 1899.
Osgood, Charles F.	VI C	See Evening, 1900.
Potter, Richard W.	V C	Second Hand Weaving, Mass Cotton Mills, Lowell, Mass.
Rockwell, Samuel F.	IIa C	Supt., Mule Dept., Davis and Furber Machine Co., No. Andover, Mass.
xSchermerhorn, George E.	I C	Overseer, Chas. Chipman's Sons, Easton, Pa.
Smith, Wm. H.	IIb C	Postal Clerk, Postoffice, Methuen, Mass.
Stevenson, William	III C	See Evening, 1899.
Stopherd, Wm. H.	VI C	See Evening, 1899.
Umpleby, Thomas B.	V C	Supt., Humphrey and Sons, Ltd., Moncton, N. B.
Varney, Manley H.	III C	Overseer, Amory Mfg. Co., Manchester, N. H.
Vogt, Alfred H.	III C	Designing Room, George E. Kunhardt, Lawrence, Mass.
Walker, David	III C	Overseer, Burlington Mills, Winooski, Vt.
Wilson, Calvin E.	IIb C	Overseer, Twisting, Cranston Worsted Mills, Bristol, R. I.
Wilson, George H.	IIb C	Section Hand, Lower Pacific Mills, Lawrence, Mass.
Wood, Jonathan	I C	Boott Mills, Lowell, Mass.

### Day Course, 1903.

Name	Course	Occupation
Bennett, Edward H.	V C	F. P. Bennett and Co., New York City.
Bloom, Wilfred N.	IV D	Asst. Mgr., Read, Holliday and Sons, Ltd., New York City.
Campbell, Louise P.	IIIb C	Designer, Lowell, Mass.
Campbell, Orison S.	II D	Bookkeeping, American Felt Co., Dolgeville, N. Y.
Chamberlin, Frederick E.	I D	Asst. Supt., China, Webster and Pembroke Mills, Suncook, N. H.
Emerson, Frank W.	II D	Supt., Moosup Mill, Moosup, Conn.
xEvans, Alfred W.	III D	Arlington Mills, Lawrence, Mass.
xEvans, Wm. R.	III D	Bradford, Mass.
Ferguson, Arthur F.	I D	See Day, 1902.
Fuller, George	I D	Designer, Arnold Print Works, No. Adams, Mass.
Gerrish, Walter	III D	Overseer, Aetna Mills, Watertown, Mass.
Holgate, Benj.	V C	See Day, 1902.
Hutton, Clarence	III C	See Evening, 1900.
Morrison, Fred C.	I D	Clerk, Levi W. Phelps, Ayer, Mass.
Najarian, Garabed	IV D	Overseer of Dyeing, Monument Mills, Housatonic, Mass.
Petty, George E.	I-V C	In business, Greensboro, N. C.
Pradel, Mrs. A. J. (Walker)	IIIb C	Woonsocket, R. I.
*Rasche, Wm. A.	III D	
Reynolds, Isabel H.	III-V C	Asst. to Designer, Arlington Mills, Lawrence, Mass.
xRobinson, Wm. C.	III-V C	With Russell Mfg. Co., Middletown, Conn.
Snelling, Fred N.	II D	With American Express Co., Haverhill, Mass.
xSpiegel, Edward	V C	In business, New York City.
Stevenson, Murray R.	III-V C	Designer, Russell Mfg. Co., Middletown, Conn.
Stewart, Walter L.	III D	Designer, Clarence Whitman and Co., New York City.
Wilson, John S.	II D	Designer, U. S. Bunting Co., Lowell, Mass.

### Evening Course, 1903

Adams, Henry S.	IIa C	Purchasing Agent, Union Buffalo Mills Co., Union, S. C.
Balmforth, James H.	IIa C	Conductor, Public Service Corporation, Bloomfield, N. J.
Barry, Edward J.	III C	Overseer, Weaving, Jackson Mfg. Co., Nashua, N. H.
Bastow, Henry	III C	Warp Dresser, Arlington Mills, Lawrence, Mass.
Baxter, Alvah J.	IIa C	Bookkeeper, Assabet Mills, Maynard, Mass.
Byam, Walter S.	VI C	Draftsman, Lowell Machine Shop, Lowell, Mass.
Cady, Dennis J.	V C	Section Hand, Weaving, Washington Mills, Lawrence, Mass.
Donnellan, Frank T.	V C	See Evening, 1902.
Flynn, John J.	VI C	Bookkeeper, Coffey Bros., Lowell, Mass.
French, Mrs. Martha B. (Balmforth)	III C	Tewksbury, Mass.

Name	Course	Occupation
xGarner, William	III C	Foreman of Refinery, Warren Bros. Co., Washington, D. C.
Gaunt, Alfred C.	IIa C	See Evening, 1899.
Goodchild, George	I C	Draftsman, Lowell Machine Shop, Lowell, Mass.
xGray, Finley M.	VI C	Machinist, Lowell Machine Shop, Lowell, Mass.
xHiggins, James A.	IIa C	Spinner, Talbot Mills, No. Billerica, Mass.
Howard, John	III C	Overseer Weaving, Belvidere Woolen Mills, Lowell, Mass.
Hunter, Ralph	V C	See Evening, 1901.
Jennings, James J.	III C	Designer, Lyman Mills, Holyoke, Mass.
Johnson, Samuel L.	V C	Second Hand Weaving, Arlington Mills, Lawrence, Mass.
Keleher, John J.	IIb C	Section Hand, Washington Mills, Lawrence, Mass.
Knowles, Frank E.	I C	Overseer, Tremont and Suffolk Mills, Lowell, Mass.
Lawrence, Charles	I C	Overseer Mule Spinning, Dartmouth Corp., New Bedford, Mass.
Leach, Joseph W.	V C	Designer, Pacific Mills, Lawrence, Mass.
Lincourt, Hector L.	VI C	Machinist, C. T. Rowland, Lowell, Mass.
Lord, Wilfred	IIb C	See Evening, 1901.
xMason, Frederick A.	I C	Mule Spinner, Saxony Worsted Mills, Newton, Mass.
Moir, Alexander L.	P. G. III C	See Evening, 1899.
Mortenson, Carl W.	III C	Accountant, Talbot Mills, No. Billerica, Mass.
Mozley, Arthur	VI C	Transformer Tester, Westinghouse Electric Mfg. Co., Pittsburg, Pa.
Myers, James W.	III-IV C	Clerk, U. S. Bunting Co., Lowell, Mass.
Nicholson, Richard	IIb C	Section Hand, Washington Mills, Lawrence, Mass.
Noonan, Denis T.	III C	Asst. Supt., Knoxville Woolen Mills, Knoxville, Tenn.
xPalmer, G. Buel	III C	Lowell, Mass.
Rockwell, Henry D.	IIa C	Clerk, Davis and Furber Machine Co., No. Andover, Mass.
Schofield, John S.	III C	Pattern Weaver, Kunhardt's Mill, Lawrence, Mass.
Schoon, Fenton	IIb C	Section Hand, Worsted Drawing, Lower Pacific Mills, Lawrence, Mass.
Stokham, Burton I.	IV C	Asst. Chemist, Bigelow Carpet Co., Lowell, Mass.
xTonge, Matthew	III C	Weaver, Dartmouth Mfg. Co., New Bedford, Mass.
Upton, Frank A.	I C	Carder, Mass. Cotton Mills, Lowell, Mass.
Varney, Manley H.	I C	See Evening, 1902.
Walker, David	P. G. III C	See Evening, 1902.

#### Day Course, 1904.

Abbott, Edward M.	II D	Asst. Supt., Abbott Worsted Co., Graniteville, Mass.
Baldwin, Frederick A.	II D	With Washington Mills, Lawrence, Mass.

Name	Course	Occupation
Clapp, F. Austin	II D	Asst. to Manager, Earnscliffe Worsted Mills, New York City.
Clogston, Raymond B.	IV D	Foreman of Mercerizing, Arnold Print Works, No. Adams, Mass.
Culver, Ralph F.	IV D	Asst. Dyer, Arnold Print Works, North Adams, Mass.
Cutler, Benj. W., Jr.	III D	Supt., Ayvad Mfg. Co., Hoboken, N. J.
Dewey, James F.	II D	Supt., Dewey's Mills, Quechee, Vt.
Donald, Albert E.	II D	Asst. Supt., Worsted Yarn Dept., Wood Worsted Mills, Lawrence, Mass.
Halsell, Elam R.	I C	With Appleton Mills, Lowell, Mass.
xHorsfall, George G.	II-III-V C	Asst. Designer, Martinsburg Worsted and Cassimere Co., Martinsburg, W. Va.
Jones, Everett A.	II C	Franklin, N. H.
Jury, Alfred E.	IV D	With Wells, Richardson and Co., Burlington, Vt.
Lucey, Edmund A.	II D	Cost Finding, Saylesville Bleachery, Saylesville, R. I.
MacPherson, Wallace A.	III D	With National and Providence Mills, Providence, R. I.
Meadows, Wm. R.	I D	Director, Miss. Textile School, Agricultural College, Miss.
O'Donnell, John D.	I C	Clerk, Travers Bros. Co., New York City.
O'Hara, Wm. F.	IV C	Chemist, Innis, Speiden and Co., New York City.
Parker, Everett N.	I C	With Parker Bobbin Co., Lowell, Mass.
Smith, Ralston F.	I C	With Republic Belting Co., Cleveland, Ohio.
Stevens, Dexter	I D	Yarn Supt., Lancaster Mills, Clinton, Mass.
Toovey, Sidney E.	V C	Percher, Talbot Mills, No. Billerica, Mass.
Webb, Frank H.	IV D	Asst. in Laboratory, American Woolen Co., Lawrence, Mass.
White, Royal P.	II D	Supt., Stirling Mills, Lowell, Mass.
Wilson, Walter E. H.	I C	Machinist, D. H. Wilson and Co., Lowell, Mass.

#### Evening Course, 1904.

Adams, Michael E.	VI C	Shipping Clerk, National Biscuit Co., Lowell, Mass.
Balmforth, James H.	IIa-b C	See Evening, 1903.
Balmforth, Wm. F.	VI C	No. Billerica, Mass.
xBarker, John P.	V C	Peacedale, R. I.
Barrington, John A.	IV C	With Kalle and Co., Boston, Mass.
xBoucher, John L.	VI C	Lowell, Mass.
xButler, Benj. O.	VI C	Lowell, Mass.
xCallahan, Patrick A.	VI C	With Lower Pacific Mills, Lawrence, Mass.
Cheetham, John Joseph	I C	Asst. Second Hand, Mass. Cotton Mills, Lowell, Mass.
xConley, Frederick A.	VI C	Machinist, Kitson Machine Co., Lowell, Mass.
Connors, Edward F.	VI C	Draftsman, Lowell, Mass.
Davis, Prentice T.	I C	Overseer Carding, Boott Mills, Lowell, Mass.

Name	Course	Occupation
Delmage, Edward R.	III C	Overseer Weaving and Asst. Supt., Thomas Kent Mfg. Co., Clifton Heights, Pa.
xDempsey, John W.	IIa C	Spinner, Bigelow Carpet Co., Lowell, Mass.
Donahue, Michael F.	VI C	Boston, Mass.
Doole, George L.	VI C	Weaver, U. S. Bunting Co., Lowell, Mass.
Dooley, Edward W.	VI C	With Spencer and Co., Lowell, Mass.
Duggan, Francis P.	VI C	Second Hand, U. S. Cartridge Co., Low- ell, Mass.
Frank, Emil M.	III C	Asst. Designer, Arlington Mills, Lawrence, Mass.
Gaunt, Alfred C.	IIb C	See Evening, 1899.
Hempel, Frank	V C	Room Hand, Washington Mills, Law- rence, Mass.
Higgins, James A.	IIa-b C	See Evening, 1903.
Hoyle, Joseph	IIb C	Section Hand, Moore Spinning Co., No. Chelmsford, Mass.
Jeannotte, Arthur	VI C	Carpet Finishing, Bigelow Carpet Co., Lowell, Mass.
xKershaw, Wm. E.	V C	Weaver, Talbot Mills, No. Billerica, Mass.
Langevin, Felix D.	VI C	Asst. Supt., Kitson Machine Co., Lowell, Mass.
xLord, Harry D.	III C	Lowell, Mass.
Lord, Wilfred	IIa C	See Evening, 1901.
McBride, Robert G.	IIa C	Mule fixer, Merrimack Woolen Mills, Low- ell, Mass.
Merrill, Edwin C.	VI C	Draftsman, Eng. Dept., City Hall, Law- rence, Mass.
Miller, Emil H.	V C	With Lower Pacific Mills, Lawrence, Mass.
Moorehouse, Thomas	VI C	Lawrence, Mass.
Murphy, John H.	VI C	Salesman, Putnam and Son Co., Lowell, Mass.
Notman, Frederick W.	I C	Clerk, Mass. Cotton Mills, Boston, Mass.
Patrick, Alexander	III C	Weaver, Harriman Suspender Factory, Lowell, Mass.
Redman, Henry S.	III C	Clerk, Appleton Co., Lowell, Mass.
xReed, Foster C. K.	VI C	Steam Engineer, Farwell Bleachery, Law- rence, Mass.
Rhodes, Joseph E.	V C	Wire Sharpener, Mass. Mohair Plush Co., Lowell, Mass.
Rooney, George W.	I C	Second Hand, Hamilton Mfg. Co., Lowell, Mass.
Shaw, James	V C	Weaver, Plush Mill, Lowell, Mass.
Smith, Edward	I C	Overseer Carding, Boott Mills, Lowell, Mass.
Smith, John W.	IIb C	Section Hand, Arlington Mills, Lawrence, Mass.
xSterling, Walter	III C	New Bedford, Mass.
Stokham, Burton I.	P. G. IV C	See Evening, 1903.
Tarpey, John F.	IIa C	With Merrimack Mfg. Co., Lowell, Mass.
Thompson, Charles B.	VI C	Lowell, Mass.
Webb, Francis H.	V C	Quiller, Mass. Mohair Plush Co., Lowell, Mass.



### Day Course, 1905.

Name	Course	Occupation
Adams, Henry S.	I D	See Evening, 1903.
Arundale, Henry B.	II-III-V C	Instructor, Lowell Textile School, Lowell, Mass.
Boyd, George A.	I D	Office Mgr., Chicopee Mfg. Co., Chicopee Falls, Mass.
Carr, George E.	I D	With Wyoming Valley Lace Mills, Wilkes-barre, Pa.
Cole, James T.	II D	Overseer of Linen and Rug Mfg., Mass. Commission for Adult Blind, Cambridge, Mass.
Conklin, Jennie G.	IIIb C	Commercial Designer, Boston, Mass.
Curtis, Wm. L.	II C	Clerk, Parker, Wilder and Co., Boston, Mass.
Dillon, James H.	III D	Library Bureau, Boston, Mass.
Harris, Charles E.	I D	Employment Agent, West Boylston Mfg. Co., Easthampton, Mass.
Hollings, James L.	I D	Designer, American Mills Co., Waterbury, Conn.
Hook, Russell W.	IV D	Instructor, Dyeing, Lowell Textile School, Lowell, Mass.
Hunt, Chester L.	III C	Sample Dresser and Weaver, Peacedale Mfg. Co., Peacedale, R. I.
Jones, Everett A.	III D	See Day, 1904.
Lee, Wm. H.	V C	Farr Alpaca Co., Holyoke, Mass.
Lewis, Walter S.	IV D	Woburn, Mass.
McKenna, Hugh F.	IV D	Color Chemist, United Indigo and Chemical Co., Ltd., Boston, Mass.
Midwood, Arnold J.	IV D	Chemist, Levinstein and Co., Boston, Mass.
Moore, Everett B.	I D	Lowell, Mass.
Parker, Everett N.	I D	See Day, 1904.
xRoberson, Pat H.	I C	Lowell, Mass.
Roberts, Carrie I.	IIIb C	Designer, Lowell, Mass.
xThomas, Roland V.	I C	Lowell, Mass.
xThompson, Everett L.	I D	Draftsman, Associated Factory Mutual Fire Ins. Co., Boston, Mass.
Warren, Philip H.	II D	With Puritan Mills, Plymouth, Mass.
Wheelock, Stanley H.	II D	Supt., Stanley Woolen Co., Uxbridge, Mass.
Wright, Edward, Jr.	II C	Asst. Engineer, State Board of Health, Lawrence, Mass.

### Evening Course, 1905.

Bake, Herbert	III C	Asst. Designer, Walworth Bros., Lawrence, Mass.
Bastow, Henry	V C	See Evening, 1903.
Bell, Frederick W.	IIa C	Spinner, Stirling Mills, Lowell, Mass.
Bowie, Samuel A.	VI C	Engineer, Pacific Mills, Lawrence, Mass.
Brown, James P.	III C	Pilling Shoe Shop, Lowell, Mass.
Bryant, Ernest L.	VI C	Clerk, W. T. S. Bartlett Co., Lowell, Mass.
xBurke, Thomas F.	I C	Lowell, Mass.
Burns, Edward J.	IV C	Tester, U. S. Cartridge Co., Lowell, Mass.
Burns, James E.	IV C	Chemist, U. S. Cartridge Co., Lowell, Mass.

Name	Course	Occupation
xCaron, Cleophas	I C	Second Hand, Spinning Dept., Queen City Cotton Co., Burlington, Vt.
Collins, John A.	IIa-b C	With Arkwright Mutual Fire Ins. Co., Boston, Mass.
Cook, Cheney E.	III C	With Winslow Bros. and Smith Co., Norwood, Mass.
Custer, James J. E.	V C	Lowell, Mass.
Dana, Clarence A.	VI C	Draftsman, Lowell Machine Shop, Lowell, Mass.
Dick, Hugo P.	III C	Section Hand, Lower Pacific Mills, Lawrence, Mass.
Dimlick, Benj. C.	III C	Cloth Examiner, Wood Worsted Mills, Lawrence, Mass.
Erbe, Gustave	VI C	Machinist, Beckett and Hammond Machine Co., Haverhill, Mass.
Foster, Sherwood L.	I C	Chief Clerk, Gen. Electric Co., Boston, Mass.
xFrench, Ernest J.	I C	Clerk, Upper Pacific Mills, Lawrence, Mass.
Gay, Earle B.	I C	Second Hand Carding, Dana Warp Mills, Westbrook, Me.
Goodchild, George	VI C	See Evening, 1903.
Harder, Elmer E.	VI C	Janitor, Highland School, Lowell, Mass.
Haven, George W.	III C	With Blake and Stearns, Boston, Mass.
Howard, Thomas	V C	Overseer, Harriman Mfg. Co., Lowell, Mass.
xHunt, Herbert R.	VI C	Asst. Chief Draftsman, DeLamar's Copper Refining Co., Chrome, N. J.
Hunton, Lewis G.	IV C	Clerk, J. G. Hunton, Lowell, Mass.
Kenworthy, Joseph	I C	Second Hand, Mass. Mfg. Co., Lowell, Mass.
Kimball, Irving D.	VI C	Patent Dept., Lowell Machine Shop, Lowell, Mass.
Lamson, George F.	VI C	See Day, 1900.
Linkletter, Alfred C.	VI C	Steamfitter, H. R. Barker Mfg. Co., Lowell, Mass.
xLovell, Charles E.	VI C	Los Angeles, Calif.
Maguire, James H.	VI C	Second Hand, Ring Spinning, Lowell Machine Shop, Lowell, Mass.
Martin, John C., Jr.	IIa-b C	Tailor, J. C. Martin, Lowell, Mass.
McManus, Hugh	V C	With Middlesex Co., Lowell, Mass.
Molloy, Andrew	III C	See Evening, 1902.
O'Neill, Peter F.	IV C	Asst. Chemist, Dana Warp Mills, Westbrook, Me.
xOverend, John	V C	Hand Dresser, Arlington Mills, Lawrence, Mass.
Redman, Henry S.	V C	See Evening, 1904.
Silk, Frederick C. M.	IV C	Asst. Colorist, Bigelow Carpet Co., Lowell, Mass.
Simola, Emil J.	IIa-b C	Finland.
Skinner, Clarence W.	III C	With Brightwood Mfg. Co., No. Andover, Mass.
Smith, Arthur	III C	Designer, Pemberton Mills, Lawrence, Mass.
Smith, George A.	III C	Overseer, Tremont Worsted Co., Methuen, Mass.

Name	Course	Occupation
Smith, Wm. E.	III C	Asst. Designer, Arlington Mills, Lawrence, Mass.
Stevens, Frank W.	VI C	Draftsman, Locks and Canals, Lowell, Mass.
Stopherd, Wm. H.	III C	See Evening, 1899.
Tonge, John	IV C	With Pacific Mills, Lawrence, Mass.
Wilde, Thomas E.	IIa C	Stenographer, Jeremiah Clark Machine Co., Lowell, Mass.
Wiswall, Frank T.	V C	Weaver, George E. Kunhardt's Mill, Lawrence, Mass.

### Day Course, 1906.

Avery, Charles H.	II D	With Strong, Hewat and Co., No. Adams, Mass.
Bradford, Roy H.	II D	Asst. Supt., Smith and Dove Mfg. Co., Andover, Mass.
Church, Charles R.	II-V C	Lowell, Mass.
Churchill, Charles W.	III D	Lowell, Mass.
Cole, Edward E.	IV D	Asst. Tenterer, Glenlyon Dye Works, Saylesville, R. I.
Currier, Herbert A.	I D	N. Y. Representative, Fearing, Whiton and Co., Boston, Mass.
Curtis, Frank M.	I D	Second Hand, Lancaster Mills, Clinton, Mass.
Fleming, Frank E.	IV D	Second Hand in Dychouse, Middlesex Bleachery and Dye Works, Somerville, Mass.
Gahn, George L.	II D	With Wood Worsted Mills, Lawrence, Mass.
Gillon, Sara A.	IIIb C	Designer, Lowell, Mass.
Hennigan, Arthur J.	II D	Wool Salesman, S. D. Smith, Jr., Boston, Mass.
Hildreth, Harold W.	II-V C	Student, Lowell Textile School, Lowell, Mass.
Hintze, Thomas F.	I C	Asst. to Supt., Boott Mills, Lowell, Mass.
Kent, Clarence L.	III-V C	Cost Accountant, Arlington Mills, Lawrence, Mass.
Lane, John W.	I C	Student, Lowell Textile School, Lowell, Mass.
McDonnell, Wm. H.	I-V C	So. Boston, Mass.
Newcomb, Guy H.	IV C	With Continental Color Co., Boston, Mass.
Reynolds, Isabel H.	P. G. III-V C	See Day, 1903.
Stohn, Alexander C.	III-V C	Designer, Arlington Mills, Lawrence, Mass.
Swan, Guy C.	II D	With Wood Worsted Mills, Lawrence, Mass.
Varnum, Arthur C.	II D	Second Hand, Weave Room, Stirling Mills, Lowell, Mass.
Wightman, Wm. H.	IV D	Chemist, Continental Color and Chemical Co., Boston, Mass.
Wood, Herbert C.	I D	Second Hand, Tremont and Suffolk Mills, Lowell, Mass.
Woodruff, Charles B.	V C	With Goodall, Brown and Co., Birmingham, Ala.

# Evening Course, 1906.

Name	Course	Occupation
Abbott, Paul W.	I C	Second Hand, Machine Dept., Lowell Machine Shop, Lowell, Mass.
Amiot, Louis H.	Va C	With American Hide and Leather Co., Lowell, Mass.
Armstrong, Elias B.	IIb C	With Joy, Langdon and Co., Boston, Mass.
Bake, Herbert	P. G. III C	See Evening, 1905.
Brouder, John J.	III C	Asst. Designer, Wood Worsted Mills, Lawrence, Mass.
Brown, James P.	P. G. III C	See Evening, 1905.
Brown, Wm. G.	IIb C	President, Geo. C. Moore Wool Scouring Mills, No. Chelmsford, Mass.
Burgess, Joseph H.	Va C	Weaver, Arlington Mills, Lawrence, Mass.
Burnham, Joseph W.	III C	Plymouth, Mass.
Burnham, Wilmont V.	Vb C	With Geo. E. Kunhardt, Lawrence, Mass.
Dick, Hugo P.	P. G. III C	See Evening, 1905.
Dickson, Andrew	IIa C	Asst. Shipping Clerk, Coronet Worsted Co., Mapleville, R. I.
Dinlick, Benj. C.	P. G. III C	See Evening, 1905.
Dodge, Frank	I C	Second Hand, Hamilton Co., Lowell, Mass.
Duce, Benj.	III C	Overseer Weaving, Brightwood Mfg. Co., No. Andover, Mass.
Ellis, George W.	VII C	With D. W. Ellis and Son, Monson, Mass.
Eyers, John T.	IV C	Overseer of Finishing, James J. Regan Co., Rockwell, Conn.
Frank, Emil M.	P. G. III C	See Evening, 1904.
xFulton, John M.	V C	Lowell Bleachery, Lowell, Mass.
Gregson, Robert B.	Va C	Third Hand Combing Room, Hamilton Mfg. Co., Lowell, Mass.
Haigh, Wm.	Vb C	Boott Mills, Lowell, Mass.
Hartwell, Henry E.	VI C	Engineer, Washington Mills, Lawrence, Mass.
Hoessler, Carl, Jr.	III C	Loomfixer, Assabet Mills, Maynard, Mass.
Howard, John	IIa C	See Evening, 1900.
Hutton, Harold	V C	With N. E. Bunting Co., Lowell, Mass.
Hutton, John M.	Vb C	With N. E. Bunting Co., Lowell, Mass.
xInberg, Magnus	I C	Fitchburg, Mass.
Johnson, Ernest A.	V C	See Evening, 1902.
Kidd, Thomas E.	IV C	With N. E. Telephone Co., Boston, Mass.
Laffert, August W.	III C	Loomfixer, Wood Worsted Mills, Law- rence, Mass.
Maguire, James H.	I C	See Evening, 1905.
McCarthy, Joseph F.	III C	Expert Cloth Examiner, Wood Worsted Mills, Lawrence, Mass.
McLaughlin, Peter J.	I C	Second Hand, Mass. Cotton Mills, Lowell, Mass.
McLay, John	Vb C	Clerk, Washington Mills, Lawrence, Mass.
Michelmores, Harry	III C	Asst. Designer, Brightwood Mfg. Co., No. Andover, Mass.
Molloy, Andrew	P. G. III C	See Evening, 1902.
Morton, Albert N.	IIb C	At Kitson Machine Shop, Lowell, Mass.
xMurphy, Cornelius D.	IIa C	With Tremont and Suffolk Mills, Lowell, Mass.
Nelson, Ernest H.	III C	See Evening, 1900.

Name	Course	Occupation
O'Brien, David A.	IV C	With Carleton and Hovey, Lowell, Mass.
Pedler, Wm. A.	I C	Clerk, Cotton Dept., Arlington Mills, Lawrence, Mass.
Pihl, Christian E.	VI C	Master Mechanic, Appleton Mills, Lowell, Mass.
xPittendreigh, John M.	I C	Third Hand, Merrimack Mill, Lowell, Mass.
Reardon, Timothy H.	VI C	Machinist, Lowell Machine Shop, Lowell, Mass.
Reynolds, Eugene A.	VI C	With Lawrence Mfg. Co., Lowell, Mass.
Richards, Francis G.	IIa C	Wool Sorter, Arlington Mills, Lawrence, Mass.
Rushworth, Walter	VI C	Electrician, Godfrey Electric Construction Co., Lowell, Mass.
Schubert, George J.	V C	Second Hand, Pemberton Co., Lawrence, Mass.
Senior, George	Va C	Stenographer and Bookkeeper, Hamilton Mfg. Co., Lowell, Mass.
Sharpe, John R.	VI C	Overseer, Lowell Machine Shop, Lowell, Mass.
Sheppard, Byron H.	VI C	Draftsman, C. R. Makepeace and Co., Providence, R. I.
Silk, Patrick E.	VII C	Collinsville, Mass.
Skinner, Clarence W.	P. G. III C	See Evening, 1905.
Smith, Arthur	P. G. { III C Va C	See Evening, 1905.
Smith, George A.	P. G. III C	See Evening, 1905.
Smith, Wm. E.	P. G. III C	See Evening, 1905.
Stopherd, Wm. H.	P. G. III C	See Evening, 1899.
Vogt, Harry A.	Vb C	Loomfixer, Wood Worsted Mills, Lawrence, Mass.
Walker, Wm., Jr.	VII C	With Ottaquechee Woolen Co., No. Hartland, Vt.
Ward, James J.	VII C	With U. S. Bunting Co., Lowell, Mass.
*Whitcomb, Harry E.	I C	

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( DAY )

FILL OUT AND SEND TO PRINCIPAL

# Lowell Textile School

LOWELL, MASS.

## APPLICATION BLANK

Date.....

I, ..... hereby  
apply for admission to the Lowell Textile School as DAY  
student.

Name in Full, .....

Date and Place of Birth, .....

Home Residence, .....

Parent or Guardian, .....

Residence of Parent, .....

School last attended, .....

( INDICATE COURSE )

- |                          |                           |
|--------------------------|---------------------------|
| I. Cotton Manufacturing. | II. Wool Manufacturing.   |
| III. Designing.          | IV. Chemistry and Dyeing. |
| VI. Textile Engineering. |                           |

Signature, .....

ENDORSEMENT BY OFFICER OF SCHOOL LAST ATTENDED

I hereby certify that .....  
the above applicant has completed the regular four years  
course at the ..... High School.

Signed : .....

Principal ..... School, located

at ..... State of .....

Date.....

FORM FOR EVENING CLASSES ON OTHER SIDE

(EVENING)

FILL OUT AND SEND TO PRINCIPAL

# Lowell Textile School

LOWELL, MASS.

## APPLICATION BLANK

DATE.....

I, ..... hereby  
apply for admission to the Lowell Textile School as EVENING  
student.

Name in Full, .....

Date and Place of Birth, .....

Home Residence, .....

Parent or Guardian, .....

Residence of Parent, .....

School last attended, .....

(INDICATE COURSE)

- |                           |                                    |
|---------------------------|------------------------------------|
| I. Cotton Spinning.       | V. Weaving.                        |
| II. a—Woolen Spinning.    | a—Cotton Weaving.                  |
| b—Worsted Spinning.       | b—Woolen and Worsted Weaving.      |
|                           | c—Dobby and Jacquard Weaving.      |
| III. Designing.           | VI. Mechanics and Electricity.     |
| IV. Chemistry and Dyeing. | VII. Woolen and Worsted Finishing. |

Signature, .....

ENDORSEMENT BY SOME OFFICER OF SCHOOL LAST ATTENDED

I hereby certify that .....  
the above applicant is duly qualified to pursue with profit the  
work of the Lowell Textile School.

SIGNED: .....

Principal ..... School, located

at ..... State of .....

Date .....

*August, 1907*

BULLETIN  
OF THE  
Lowell Textile School  
LOWELL, MASS.

---

SPECIAL BULLETIN  
OF THE  
Course in Wool Manufacturing

---

*Issued Quarterly*

---

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Entered August 25, 1902, at Lowell, Mass., as second class matter,  
under act of Congress of July 16, 1894.

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*Moody Street and Colonial Avenue*



PAIMOUTH STREET BUILDING

# Trustees of the Lowell Textile School

(Incorporated 1895)

## Honorary Trustee

FREDERICK FANNING AYER

New York City

## The Corporation

### Officers, 1907

A. G. CUMNOCK, PRESIDENT

JAMES T. SMITH, CLERK

JACOB ROGERS, VICE-PRESIDENT

A. G. POLLARD, TREASURER

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HON. GEORGE H. MARTIN

Lieutenant Governor

Secretary Board of Education

Appointed by the Governor and Council

JACOB ROGERS, Lowell, 1908

FRANKLIN W. HOBBS, Brookline, 1910

Banker

Treasurer Arlington Mills

On the part of the City of Lowell

#### *Ex-Officiis*

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A. K. WHITCOMB

Mayor of Lowell

Superintendent of Public Schools

WILLIAM H. BROWN

JAMES H. LEIGHTON

Chairman Board of Aldermen

President Common Council

By appointment of the Lowell Textile Council

MICHAEL DUGGAN, 1907.

### Permanent Trustees

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FRANKLIN NOURSE, Lowell, Agent Lawrence Manufacturing Company

CHARLES H. HUTCHINS, Worcester, Pres. Crompton & Knowles Loom Wks.

FREDERICK A. FLATHER, Lowell, Treasurer Boott Mills

HENRY A. BODWELL, Andover, Supt. Smith & Dove Manfg. Co. Class, 1900

WILLIAM E. HALL, Lowell, Treasurer Shaw Stocking Company

### Additional Trustees Elected by Alumni Under Act of 1905

For Four Years, from July 1, 1906.

ROYAL P. WHITE, Class of 1904, Superintendent Stirling Mills, Lowell, Mass.

For Three Years, from July 1, 1906.

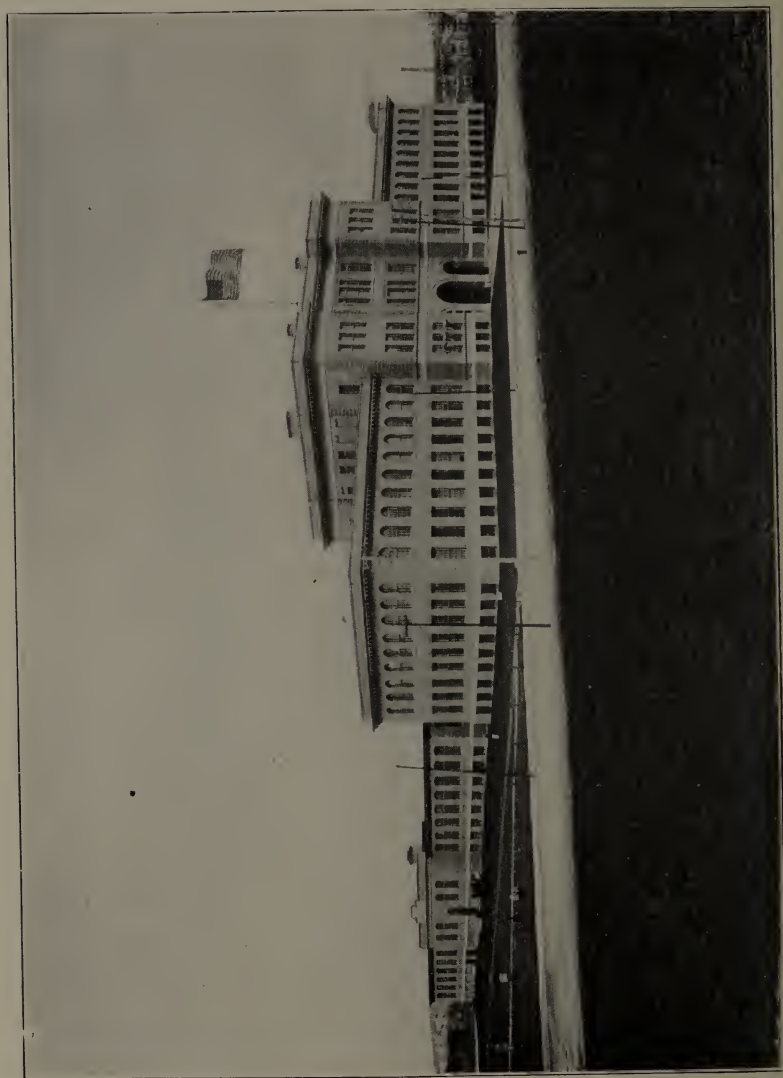
WILLIAM R. MOORHOUSE, Class of 1901, Color Chemist, Cassella Color Co., Boston, Mass.

For Two Years, from July 1, 1906.

JAMES F. SYME, Class of 1900, of the firm of H. T. Murdock & Co., Proctorsville, Vt.

For Four Years, from July 1, 1907.

T. ELLIS RAMSDELL, Class 1902, Agent Monument Mills, Housatonic, Mass.



VITSON HALL AND CAMPUS

SOUTHWICK HALL



## Officers of the Lowell Textile School.

### BOARD OF TRUSTEES

A. G. CUMNOCK, *President*

JAMES T. SMITH, *Clerk*

JACOB ROGERS, *Vice-President*

A. G. POLLARD, *Treasurer*

### Committee on Woolen and Worsted Dept.

FRANKLIN W. HOBBS, *Chairman*

FREDERICK A. FLATHER

---

### ADMINISTRATION

CHARLES H. EAMES, S. B., *Principal of the School*

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### FACULTY

CHARLES H. EAMES

GEORGE H. PERKINS

FENWICK UMPLEBY

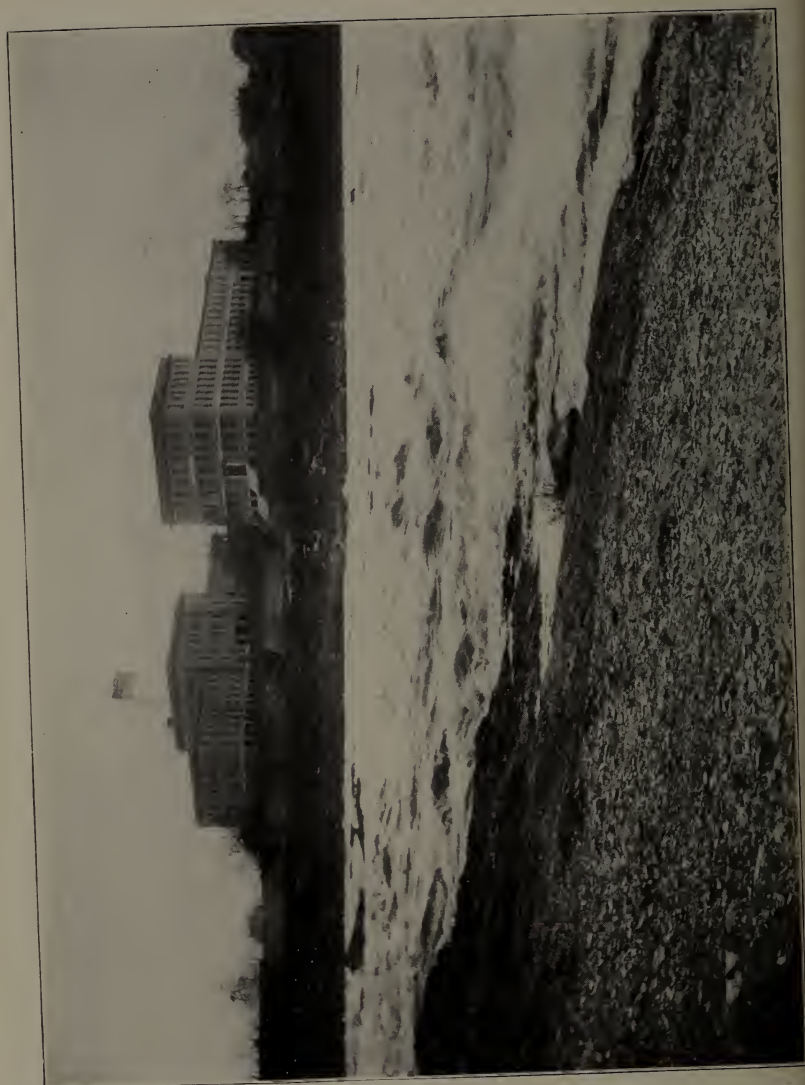
STEPHEN E. SMITH

LOUIS A. OLNEY

ARTHUR A. STEWART

EDGAR H. BARKER

*For Bulletin and Terms address Charles H. Eames, Principal.*



FALMOUTH STREET BUILDING.

# Wool Manufacturing Course

## of the

# Lowell Textile School

The course in Wool Manufacturing extends over three school years and is arranged for those who contemplate a career in the manufacture of woolen and worsted fabrics. It includes practical instruction in all the varied processes employed in adapting the wool fiber to fabrics.

Three broad divisions are made in the subject:

- 1 Manufacture of Yarn.
- 2 Manufacture of Cloth, and Knitting.
- 3 Engineering.

The manufacture of Cloth and Knitting is subdivided into—

- (a) Textile Design and Cloth Analysis.
- (b) Power Weaving.
- (c) Knitting.
- (d) Chemistry and Dyeing.
- (e) Finishing.

Each division and subdivision is in charge of instructors who teach their subjects solely, and the description which follows herewith covers as much of the work and equipment as is of interest to one taking the course in Wool Manufacture.

While the course as a whole is arranged to fit men to manufacture fabrics, many of the graduates have found openings (in addition to general manufacturers) as wool salesmen, yarn salesmen, stylers, expert cost accountants, designers, and even in branches which have no direct connection with wool in any of its forms.

The first term of the first year is devoted to fundamental studies, and gives the necessary foundation to the course. The strictly professional work begins at the second term of the first year and continues during the remaining two and one half years.

## FIRST YEAR

### FIRST TERM

*(Common to all courses)*

	Hours of exercise
Elements of Mechanism	60
Mechanical Drawing	112
Mathematics,—Algebra	30
Hand Loom Weaving and Elements of Design	55
General Chemistry	187
Freehand Drawing	}
Decorative Art	
	15
English	15
German	20

## SYNOPSIS OF WOOL MANUFACTURING COURSE

*Yarn Manufacture:*— In charge of the department of Woolen and Worsted Yarns.

The instruction includes lectures, demonstrations and practical work in:— Raw materials, sorting, scouring, carbonizing and neutralizing, mixing and picking, carding, spinning and twisting for Woolen Yarns; and sorting, scouring, carding, gilling, backwashing, combing, drawing, spinning and twisting for Worsted Yarns.

The instruction in Worsted Yarns is particularly broad, consisting of open, cone and French drawing; cap, flyer, ring and mule spinning.

For details of this course see page 13

*Textile Design and Cloth Analysis:*— In charge of the department of Textile Design.

The instruction includes lectures, demonstrations and practical work in design, cloth analysis and construction of all standard fabrics:—trouserings, coatings, suitings, blankets, velvets, corduroys, plushes, tapestries, carpets, etc.

The department is equipped with hand looms and the student is taught the art of weaving so far as it applies to the design and construction of fabrics. The course extends through three years.

*Power Weaving:*— In charge of the department of Textile Design and Power Weaving. The instruction commences at the beginning of the second year and extends through the third.

The instruction includes lectures, demonstrations and practical work in all the details of converting yarn into cloth by power machinery, and embraces spooling, quilling, beaming, warping, slashing, dressing, weaving and braiding.

While the Wool Manufacturing students specialize on woolen and worsted weaving, the course is broad and comprehensive, and the weaving of all classes of fabrics on all types of looms is taught.

The design for cloths woven on the power looms during the third year are made by the students themselves and each student is required to produce a definite amount of a stated number of cloths before his record is clear.

The equipment is complete and representative, and includes not only looms for plain weaving but all the types for fancy effects, Jacquards, carpets, tapestry, etc.

*Knitting:*— In charge of the department of Cotton Yarns and Knitting.

A short course in the Knitting of hosiery (stockings, underwear, sweaters, etc.) is given during the third year, and its importance in Wool Manufacturing cannot be overestimated.

In the department of Woolen and Worsted Yarns the student is taught the manufacture of hosiery yarns, which are of all wool, or of wool and cotton. The importance of this branch of yarn making is one of the reasons for installing the "French system" in the school (so that "Merino Yarns" which are used so extensively in the "Knit Goods" trade could be taught in a practical manner).

In the department of Knitting these hosiery yarns are made into fabrics and the student is taught not only the art of knitting but also the value of yarns for this trade.

The department is equipped with all the necessary machinery for producing tangible results.

*Chemistry and Dyeing:*— In charge of the department of Chemistry and Dyeing.

This course extends over the first and second years and gives instruction in general chemistry, (inorganic and organic) textile chemistry and dyeing.

Aside from the splendid training which the study of chemistry gives, this course specializes for the Wool Manufacturing students on the chemistry of soaps, oils, sizes, water, dyestuffs, dyeing, etc., and is the basis of many subjects, the details of which are taken up in other departments.

Practical work in water, soap and oil analysis as well as dyeing (raw stock, yarn and cloth) is given.

*Finishing:*— In charge of the department of Finishing.

The yarn in a fabric may be perfect, the weaving and dyeing properly done, the design of exquisite taste, and yet the goods rendered unsalable because of lack of knowledge or skill in finishing.

This important combination of science and art is taught during the third year and the equipment is such that all classes of fabrics, woolen, worsted, union and cotton, can be, and are, finished.

The student becomes familiar by practical handling from loom to case with beavers, meltons, kerseys, thibets, cheviots, cassimeres, piece-dye and fancy worsteds, woolen and worsted dress goods and the subsequent processes of sponging, shrinking, etc.

*Engineering:*— In charge of the department of Engineering.

The basis of all textile manufacturing requiring machinery is mechanics and allied subjects, and a thorough training in the "Elements of Mechanism" is given and required before the student can enter the course in Wool Manufacturing.

The course in Engineering extends over three years and includes:— mathematics and mechanics, mechanical and freehand drawing, mechanical and electrical engineering and hydraulics.

The object of engineering in wool manufacturing is to train men to apply the broad views of the engineer to any and all problems which the modern manufacturer has to meet.

The work covers a wide range of subjects including:— mill construction, (with calculations and drawings) mill heating and ventilation, lighting, fire protection and humidification. Special importance is attached to the arrangement of plants and machinery for economical production—the modern methods of generation, distribution and measurements of power, etc.

A short course is given in the scientific testing of fibers, yarns and cloth in the third year.

*General:—* English composition, Decorative Art and German are compulsory during the first year for all diploma students.



## COURSE II.—WOOL MANUFACTURING

### FIRST YEAR

#### SECOND TERM

	Hours of Exercise		Hours of Exercise
Woolen Carding and Spinning	120	Textile Chemistry	15
Textile Design, Cloth Analysis	60	Freehand Drawing and Decorative	
Hand Loom Weaving	55	Art	30
Elements of Mechanism	60	Mechanical Drawing	75
Trigonometry	30	Language (German)	45
General Chemistry	30	English	15

### SECOND YEAR

#### FIRST TERM

Wool Sorting, Scouring and Spinning	240	Mechanical Engineering	30
Textile Design, Cloth Analysis	60	Power Loom Weaving	45
Textile Chemistry and Dyeing	30	Physics	30
Machine Drawing	40		

#### SECOND TERM

Wool Sorting	142	Power Loom Weaving	97
Worsted Spinning		Machine Drawing	40
Textile Design, Cloth Analysis	60	Physics	30
Textile Chemistry and Dyeing	97		
Mechanical Engineering	30		

### THIRD YEAR

#### FIRST TERM

Wool Sorting	195	Finishing	75
Worsted Spinning		Mill Engineering	30
Textile Design	30	Electrical Engineering	15
Cloth Analysis	60	Knitting	30
Power Loom Weaving	135		

#### SECOND TERM

Wool Sorting	180	Power Loom Weaving	142
Worsted Spinning		Finishing	75
Textile Design, Cloth Analysis	60	Mill Engineering	45
Thesis		Physical Laboratory	30



WOOL SORTING AND CARBONIZING

## DEPARTMENT OF WOOLEN AND WORSTED YARNS

### Instructing Staff

EDGAR H. BARKER  
*Head of Department*

HENRY H. CROMPTON  
*Instructor in Worsted Yarns*

JOHN N. HOWKER  
*Instructor in Wool Sorting*

EUGENE C. WOODCOCK  
*Instructor in Woollen Yarns*

## WOOLEN AND WORSTED YARNS

### LECTURE COURSE

#### *Raw Materials*

Animal Fibres:—Wool, Silk, Mohair, Alpaca, Vicuna, Cashmere, Camel Hair, etc.

Vegetable Fibres:—Cotton, Flax, Hemp, Jute, Ramie.

Wool Substitutes:—Noil, Shoddy, Mungo, Extracts.

Waste Products manufactured on Woollen Machinery:—Cotton Waste, Linters, Flax, Hemp, and Jute Waste.

Sources of supply and relative values of above.

Chemical and Physical properties and Composition.

Microscopical examination.

#### *Wool Fibre*

Physical and chemical structure—Differences between wool, hair and fur—

Physical properties, Strength, Elasticity, Curl, Lustre, etc.

Felting Property—Hygroscopic Property.

Structure and cause of Kemps.

Definitions of trade terms:—Picklock, XXX, XX, 1-2 Blood, 3-8 Blood, 1-4 Blood, Delaine, Braid, etc.

Pulled Wools—Their uses and classification.

#### *Wool Sorting*

Difference between Sorting and Grading—Sorting and Blending.

Judging Spinning Qualities.

Estimating Shrinkage.

Definitions of trade terms—Cots, Hog, Shurled Hogget, Wether, Fribs, Paint, Stain, Shoulder, Cast, etc.

#### *Wool Scouring*

Object of Wool Scouring.

Composition of Yolk and Suint.

Cholesterol and Lanolin.



Materials used as detergents.

Emulsion Process:—Use of Soda, Potash, Hard and Soft Soaps.

Manufacture of Scouring Soaps with tests for impurities.

Water in Wool Scouring with tests for hardness, etc.

Effect of heat on Wool Fibre with proper heat of scouring liquor.

Recovery of potash salts and wool fat from waste scouring liquor.

The Solvent process—Degreasing Wool, with Naphtha.

Construction and use of Scouring Machines and Rinse Boxes with Speeds, Adjustments and Productions.

Construction and use of Dryers, Table and Artificial.

Effect of heat on Lustre; proper heat for various classes of Wool:—  
(Braid, Botany, Mohair, etc.).

### *Carbonizing*

Object of Carbonizing.

Carbonizing Wool, Noils, Burr Waste, Rags, etc.

Carbonizing Agents:—Sulphuric Acid, Aluminum, Chloride, etc.

Hydrometers.

Strength of Carbonizing Agents.

Carbonizing with Acid Gases.

Neutralizing.

### *Burr Picking*

Object of Burr Picking—What wools are Burr Picked and why they are not carbonized.

Construction and Use of the several Kinds of Burr Pickers.

Adjustments, Speeds and Production of same.

### *Mixing and Oiling*

Object of Mixing. Laying down lots.

Mixing Different colors of Wool.

Mixing Wool with Cotton, Shoddy, Noils, etc.

Object of Oiling—Discussion of various Kinds of Oils used, Olive, Lard, etc.

Oil Testing, Viscosity, Flashing Point, etc.

Manufacture of Emulsions.

Construction and Use of Automatic Oilers, Feeds and Pickers.

Speeds, Productions and Calculations for cost of Lots when materials of different values are used.

### *Carding*

Principles of Carding.

Functions of various parts:—Feed Rolls, Lickerins, Tumblers, Workers, Strippers, Cylinders, Fancies, Dickies, Doffers, etc.

Construction of various parts.

Direction of Revolution and Speeds.

Card Clothing—Construction and uses of the various Kinds of Backing: Leather, Flexifort, etc.—The several Kinds of Wire:—Garnett, Metallic, Convex, Lickerin, etc.







The "Counts and Crown" method of counting Card Clothing.  
Card Adjusting and the use of Card Sets.  
Clothing the Card.  
Card Grinding and Grinders, Solid Roll, Traverse, Screw and Chain.

### *Woolen Cards*

Construction and use of the First Breaker, Second Breaker and Finisher.

Various methods of coupling Cards.

Card with Breast.

Woolen Card Feeds.—Object, Construction, and use of Automatic Feeds for First Breaker, Bramwell, etc.

The Construction and use of the several Kinds of Automatic Feeds for Second Breaker and Finisher, Apperly, Torrance Balling Head and Creel, Bates, Kemp, Scotch, etc.

Condensers, Rub Roll, Combination, Double Apron, etc.

Calculations for Proper Weight of Rovings, Speeds, Productions, etc.

SAMPLE CARDING.—Each student is required to make at least twenty Sample Mixes combining different colors and grades of Stock and to Felt and Mount the same. Part of the Carding to be done by Hand Cards and part on the Torrance Sample Mixing Card.

### *Woolen Mule*

Principles of Spinning. History and development.

Hand Jack, Self-operating and Self-acting Mules. The Mule-head.

Methods of Driving the various parts, Rolls, Spindles, Carriages, etc. Backing-off. Winding Mechanism.

Study of the Quadrant and Builder-rail. Regulation of the Fallers.

Double Spinning. Twisting on Mule and on Woolen Twister.

With the above lectures will be given all the necessary calculations and actual practice on the various machines.

## **Worsted**

### *Top Making*

CARDING AND PREPARING.—The principles of Worsted Carding—Types of Worsted Cards, Double Cylinder Lickerin, Breast, etc.

Speeds, Settings, Feeds, Adjustments, Productions.

PREPARING—Differences between Carding and Preparing—What Wools are Prepared and why they are not Carded. The use of Emulsions. A Set of Preparers. The calculations for Drafts on any Gill Box. The Clough Gill Box.

The proper Drafts in Preparing—Adjustments, Speeds, Productions, Calculations, etc.

GILLING AFTER CARDING—Number of Doublings, etc.



WOR-TED CARD

### *Combing*

The principles, history and development of Worsted Combing.

Combing on the Noble and Lister machines.

Calculations for Draft—Settings, Speeds, Productions, etc.

Per cents. of Noil.

GILLING AFTER COMBING—Proper Drafts and calculations for Doublings.

BACK WASHING—The object and nature of the process—Backwashing Liquors, Composition, Heat, etc.

The Hygroscopic property of Wool—Conditioning of Tops—Top Mixing.

### *Open Drawing or Bradford System*

The Principles of Drawing. Numbers of Operations for different Counts of yarn. The use of Logarithms in Drawing Calculations, Study of the Drag—Calculations for Drafts and Twist—Proper Ratch.

The functions of the Weigh Box.

Measuring Stop Motions, Candle Stick, Side Knock-off, etc.

Calculations for length.

Construction and use of Gauge Points or Constants.

Effects of Doubling.

The Dram and Hank Systems for numbering Roving.

### *Cone Drawing*

The object and use of Cone Drawing—Differential Motions, Builder Motions—Calculations for Draft—Twist—Tension and Lay—Adjustment, Speeds and Productions.

### *French Drawing*

The principles and use of French Drawing—Functions of the Porcupine. The principle of Condensing—Manufacturing of Merino Yarns.

### *Spinning, Open or Bradford System*

The Principles of Spinning. Calculations for Draft and Twist—Spinning on the Cap—Flyer and Ring Frames—The Scaife Builder Motion—Drag in Bradford System of Spinning—The use of Straight, Conical and Bell Mouthed Caps. Top Roll, Single and Double Covered, Iron and Wood.

Types of Frames, Leicester and Illingworth; Speeds, Productions, etc.

### *Spinning, French System*

Principles of Worsted Mule Spinning, Calculations for Draft and Twist, Ratch, Drag, Backing off, Winding, Re-engaging, Size and shape of Cops, Builder Motion, Quadrant. Metric and English systems of Calculations.



WORSTED COMBING

## *Twisting*

Principles of Twisting, Reeling, Weighing and Numbering of Single and Ply Yarns, Twisting on Cap, Flyer and Ring Frames—Calculations for Twist—Twist testing—Trap Twisters—Effect of direction of Twist; Speeds, Productions, Yarn Testing, etc.

The true difference between Woolen and Worsted Yarns. Layout of Machinery for different classes of Yarns—Power required for different machines—Cost of Machinery and approximate labor cost of each Department, Sorting, Scouring, Corbonizing, Picking, Carding, Combing, Drawing, Spinning, Twisting, etc., for various classes of Yarns, Carpet, Braid, Botany, etc.

## WOOL SORTING

Wool Sorting is taught by individual instruction in the second and third years, not with the idea of making journeymen sorters but to teach the students the characteristics of the various sorts and wools as they affect the yarn to be spun and the finished cloth.

The London "Count System" as well as the American "Blood System" are used and the student learns to recognize work in terms of each; for example, he will be taught that a certain wool is of 3-8s Blood and that it will spin to 38s, while another wool of 3-8s Blood by reason of soundness or extra length will spin to 40s and the reasons therefor.

The proportions and value of each sort, both of wool and by-products, (friebs, tags, etc.) as well as the blending of lots, are taught.

The range of wools sorted is varied and comprehensive and includes Spanish Merino, Australian, Ohio, Montana, South American, Native, as well as Mohair (Turkish, Cape and Native). Samples of all classes of wool are kept on hand and comparisons are made to teach the student to recognize on sight the wools from various districts. His attention is repeatedly called to faulty wool and fleeces, such as dead, cotty, kempy, topky, mushy, tender, want of trueness, etc., and the effects of these faults on the finished top or yarn explained.

The classification of pulled wools and their value is considered in detail.

Some of the wools are simply sorted, some sorted and scoured, others sorted, scoured, carbonized and neutralized, while the bulk is sorted, scoured, carded, combed, and made into top.

As the bulk of the wools sorted is scoured, the student is taught to estimate "shrinkage" on each lot and his estimate or guess proved by actual weighing after scouring. By repeated trials, his estimate is made into an intelligent guess and he learns to look for the proportions of grease, sand, dirt, dung, etc., and to reckon these factors properly in estimating the shrinkage.

The market values of wool in the grease, and on the scoured basis, is followed, and the problems of figuring the shrinkage; the clean cost;







and the cost in the grease (if any two of these three factors are known) is thoroughly demonstrated.

During the past school year 6000 lbs. of wool and mohair have been sorted.

The course extends over the second and third years.

### SCOURING

The facilities for Wool Scouring are complete and extensive and the theoretical and practical instruction given are combined in such a manner that the student knows not only "how" but "why."

The dangers of over and under scouring, excessive alkalies and heat, are repeatedly told and demonstrated. During each process of scouring the shrinkage is noted and recorded, and serves to form a basis for estimating the shrinkage made during the sorting.

The theoretical instruction in the chemistry of soaps, alkalies, hard and soft water, wool fats, greases, etc. given during the first year in "General Chemistry" (in charge of the Chemistry and Dyeing Department) is the basis of the instruction in Wool Scouring, and a clear record in this subject is required for admission to the course.

### CARBONIZING

The recovery of wool from a mixture of wool and vegetable matter is one of the most important arts in textile manufacturing. A thorough knowledge of the principles involved, the materials used, and the processes employed is therefore given.

The carbonizing of rags, noils, burr waste, card strippings, etc., both with sulphuric acid and aluminum chloride, and the process of neutralizing after carbonizing is taken up in detail.

### WOOLEN CARDING AND SPINNING

The first four months' instruction in this subject is purely applied mechanism and is divided into two parts which are carried on simultaneously.

The first of these is the mechanism of cards, card clothing, card feeds and card grinders, the second the mechanism of woollen mules. In each case the mechanical results to be obtained are stated and the mechanisms to obtain these results explained in detail. The names of all parts, the methods of adjusting and changing, and the various types of mechanism for obtaining similar results are considered. The student is thus made familiar with the existing types of machines and taught to reason for himself.

There is installed in the school two different types of woollen mules. One of these (it is immaterial which) is selected as the subject for study. It is explained, pulled down by the instructor and every motion is traced individually and the individual motions combined to form the whole.



FRENCH SPINNING DEPARTMENT

The student is required to do the same thing himself on this mule and later to investigate the second type of mule in the same manner, that is, the knowledge gained on the first mule must be applied to the second by the student himself.

A thesis of not less than 4000 words in the student's own language is required at the completion of the first term on "Cards, Self Feeds and Grinders," the written matter to be illustrated by sketches made by the student himself from the machines.

The Thesis on the "Woolen Mule" is due before the Christmas holidays of the first term of the second year, and will be of about 5000 words illustrated by diagrams as in the case of the Card Thesis.

A clear record in "Elements of Mechanism" given during the first term of the first year by the Department of Engineering is necessary for admission in the course.

The second year first term instruction consists of lectures and practical work and the actual manufacture of yarns is considered in detail.

## EQUIPMENT

### *Wool Sorting and Grading*

This department is thoroughly equipped with benches, baskets, etc., for sorting wool in a convenient manner, and in addition samples of all grades and types of wool and other fibres.

### *Scouring and Carbonizing*

Wool Scouring Machinery, C. G. Sargent's Sons Corp., Graniteville, Mass., consisting of

Cone Duster for Grease Wool.

Two Scouring Bowls, each 17 ft. x 24 in., with Parallel Rakes.

One Automatic Feeder for Scouring Bowls.

One Automatic Feeder for Dryer.

One Single Apron Dryer.

Carbonizing Screw Acid Tank.

Carbonizing Duster, with Crush Rolls.

From North Chelmsford Machine Co.

One Rinse Box.

From Schaum & Uhlinger.

One Hydro Extractor.

## Woolen

### *Picking*

One Parkhurst Burr Picker, Atlas Mfg. Co., Newark, N. J.

One Mixing Picker, Davis & Furber Machine Co., North Andover, Mass., equipped with Improved Mixing Picker Feed, and Spencer Oiler, both made by George S. Harwood & Son, Boston, Mass.



### *Carding*

One set of Woolen Cards, including:

First Breaker, Second Breaker and Finisher, Davis & Furber Machine Co., North Andover, Mass.; this set of cards equipped with Bramwell First Breaker Feed, George S. Harwood & Son, Boston, Mass.; Torrance Balling Head and Creel, (Torrance Mfg. Co., Harrison, N. J.) between First Breaker and Second Breaker; Apperly Feed, (George S. Harwood & Son, Boston, Mass.,) between Second Breaker and Finisher, and Combination Rub Rolls and Apron Condenser. (Davis & Furber Machine Co., North Andover, Mass.,) on Finisher. These cards are for medium and coarse work.

One set of Davis & Furber Woolen Cards including:

First Breaker, Second Breaker and Finisher. This set of cards equipped with Bramwell First Breaker Feed, (George S. Harwood & Son, Boston, Mass.); Apperly Feed with Kemp Traveller, (George S. Harwood & Son, Boston, Mass.,) between First Breaker and Second Breaker; Bates Feed, (E. V. Bates, Lowell, Mass.,) between Second Breaker and Finisher, and Davis & Furber Double Apron Condenser, on Finisher. These cards are for fine work.

One Sample Mixing Card, Torrance Mfg. Co., Harrison, N. J.

### *Spinning*

One Spinning Mule, 120 spindles, Davis & Furber Machine Co., North Andover, Mass.; Bobbin Holders, supplied by American Bobbin Holder Co., W. Medway, Mass.

One Spinning Mule, 120 spindles, Johnson & Bassett, Worcester, Mass.; Bobbin Holders supplied by Murdock & Geb, Franklin, Mass.

One 1907 Fancy Yarn Twister, 20 spindles, Davis & Furber, Machine Co., North Andover, Mass.

### *Card Grinding*

One Roy Grinding Frame, B. S. Roy & Son, Worcester, Mass.

Two Roy Traverse Grinders, B. S. Roy & Son, Worcester, Mass.

One Entwistle Traverse Grinder, T. C. Entwistle Co., Lowell, Mass.

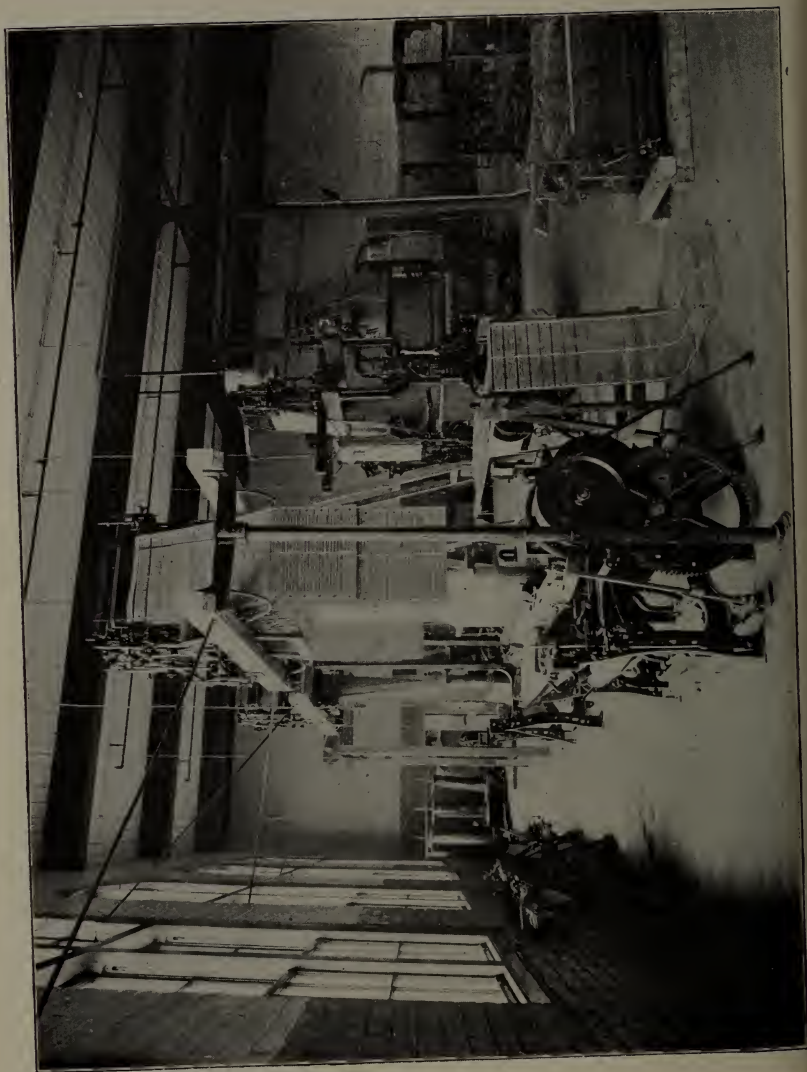
One Complete set of Carders' Tools, W. H. Brown, Worcester, Mass.

## **Worsted**

### *Carding*

One 50-inch Double-cylinder Worsted Card (4 lickerin), Davis & Furber Machine Co., North Andover, Mass., equipped with Bramwell Feed, George S. Harwood & Son, Boston, Mass.







### *Backwashing*

One Double Bowl, Five Cylinder Backwasher, with Gill Box, Taylor-Wadsworth & Co., Leeds, Eng., equipped with blueing motion, oiling motion, and Layland Patent pressure motion.

### *Gilling*

One Doubling Balling Head Gill Box (with double screws), Lowell Machine Shop, Lowell, Mass.

One Weigh Gill Box and Creel, Lowell Machine Shop, Lowell, Mass.

### *Combing*

One Baller, (punch), Crompton & Knowles, Worcester, Mass.

One Noble Worsted Comb, Crompton & Knowles, Worcester, Mass.

### *Gilling*

One Finishing Can Gill Box, Hall & Stell, Keighley, England.

One Finishing Balling Head Gill Box, Hall & Stell, Keighley, England.

### *Bradford System of Drawing, Spinning and Twisting*

The following Drawing, Spinning and Twisting Machinery, from Prince Smith & Son, Keighley, England.

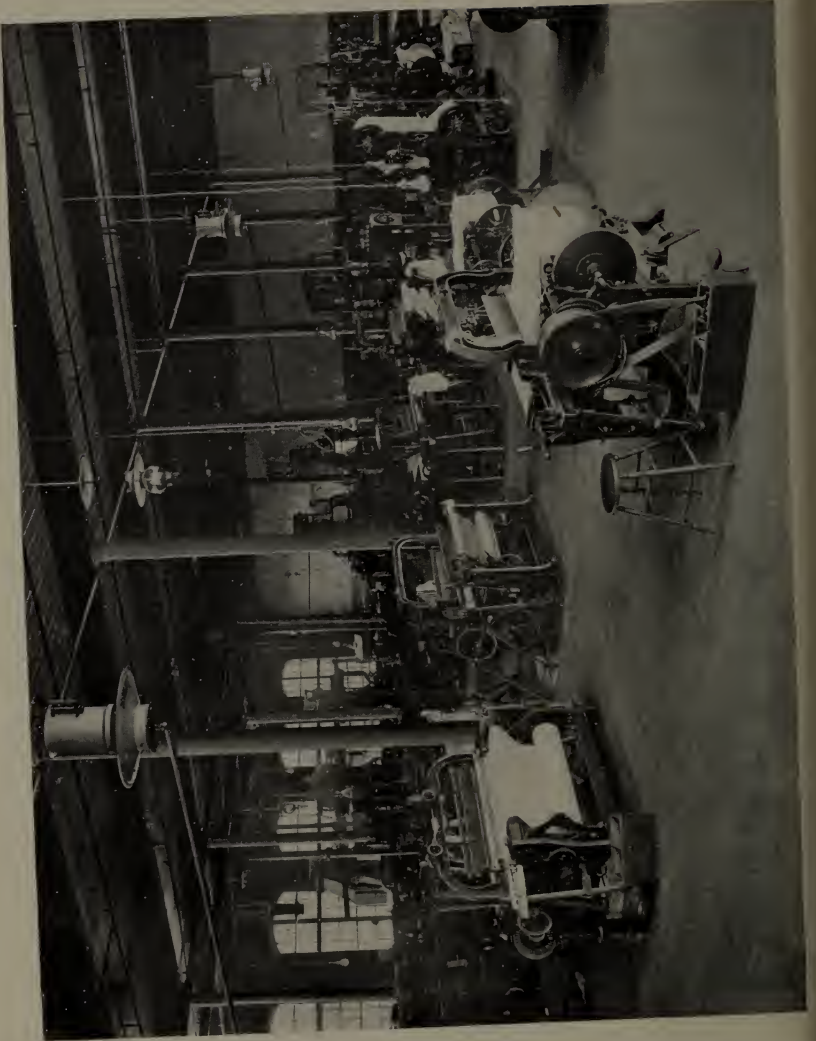
One Double Head Can Gill Box.	One 12 Spindle Dandy Reducer.
One Revolving Creel for 12 Balls.	One 12 Spindle Cap Spinner.
One 2 Spindle Gill Box.	One 12 Spindle Flyer Spinner.
One 2 Spindle Drawing Box.	One 12 Spindle Ring Spinner.
One 2 Spindle Weigh Box.	One 12 Spn. 2 Fold Cap Twister.
One 4 Spindle First Finisher.	One 12 Spn. 6 Fold Ring Twister.

The following Drawing, Spinning and Twisting Machinery from the Lowell Machine Shop, Lowell, Mass.:

One 2 Spindle Drawing Box.	One 48 Spindle Cap Spinner (4 foot end).
One 6 Spindle Second Finisher.	One 48 Spindle Cap Spinner (5 foot end).
One 24 Spindle Dandy Rover.	One 48 Spindle Boyd Ring Twister.
One 6 Spindle Cone Reducer.	
One 8 Spindle Cone Rover.	
One Six Gang Universal Winder, equipped for cones or straight tubes, Universal Winding Co., Boston, Mass.	
One Tape Band Sewing Machine, The Singer Mfg. Co., New York.	

### *French System of Drawing and Spinning*

The machinery made by the "Societe Alsacienne de Constructions Mechaniques" at Mulhouse, France, consists of the following:



## FRENCH NAMES

Gill Box (2 têtes)  
 Étirage à Frottoirs (2 têtes)  
 Étirage à Frottoirs (2 têtes)  
 Étirage à Frottoirs (3 têtes)  
 Étirage à Réunion (4 Peignes)  
 Bobinier de Châte (8 Peignes)  
 Bobinier (8 Peignes)  
 Bobinier (8 Peignes)  
 Bobinier (8 Peignes)  
 Finisseur (16 Peignes)  
 Selfacting à Filer (150 Broches)

*Yarn Weighing and Testing*

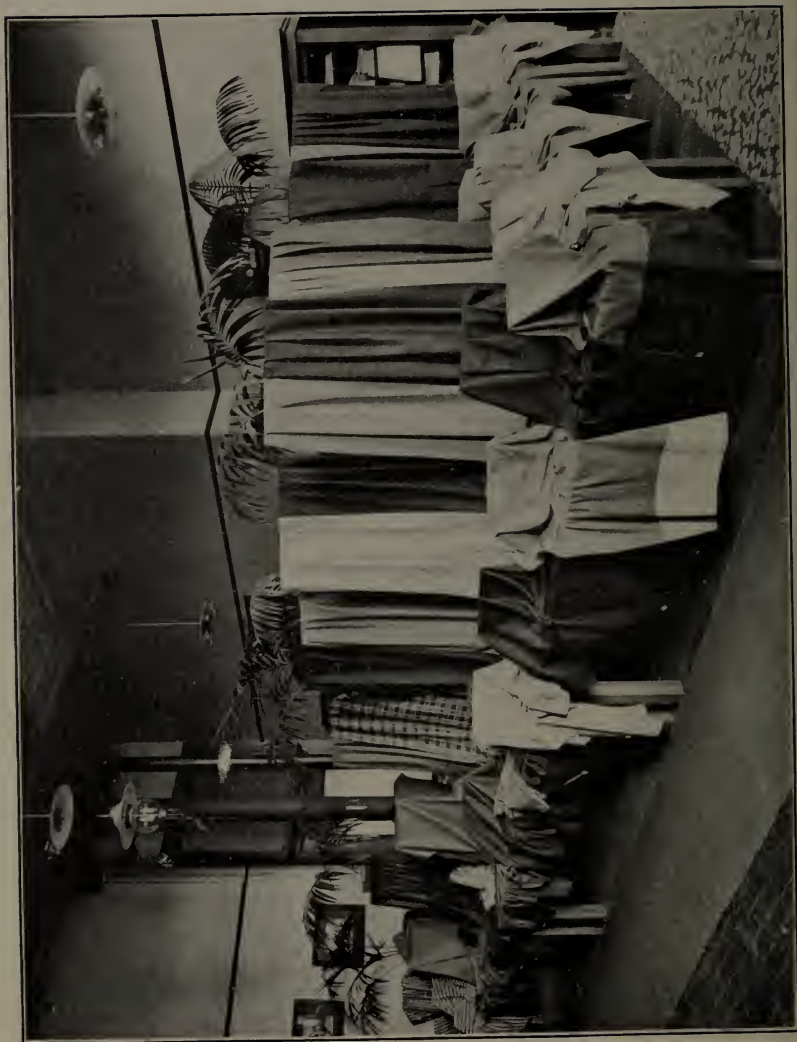
Two Yarn Reels.  
 One Roving Reel.  
 Three Grain Scales.  
 One Run Beam

## ENGLISH NAMES

Gill Box (2 heads)  
 1st Drawing (2 heads)  
 2nd Drawing (2 heads)  
 3rd Drawing (2 heads)  
 Reducer (4 Porcupines)  
 Slubber (8 Porcupines)  
 1st Intermediate (8 Porcupines)  
 2nd Intermediate (8 Porcupines)  
 Rover (8 Porcupines)  
 Finisher (16 Porcupines)  
 Selfacting Mule (150 Spindles)

One Hand Yarn Strength Tester.  
 Two Twist Counters.  
 One Barbour Knotter.

FOR A DETAIL LIST OF THE EQUIPMENT OF THE OTHER DEPARTMENTS IN WHICH STUDENTS OF THIS COURSE RECEIVE INSTRUCTION, THE READER IS REFERRED TO THE GENERAL BULLETIN OF THE SCHOOL. THE SAME BULLETIN ALSO CONTAINS OUTLINES OF THE WORK REQUIRED OF STUDENTS OF COURSE II BY OTHER DEPARTMENTS AS MENTIONED ON PAGES 8 AND 9 OF THIS BULLETIN



## ENTRANCE QUALIFICATIONS FOR DAY CLASSES

Candidates for admission are accepted upon presentation of properly vouched certificate showing the completion of a regular four year High School course. For all others, there are held examinations in June and September; candidates failing to pass at June examinations are allowed to try again in September; those who cannot attend the June examinations, may present themselves in September; if conditioned, a further examination will be appointed. Examinations cover in general the following subjects:

### Arithmetic

Definitions; elementary, operations in addition, subtraction, multiplication and division; squares; cubes; square root; interest, discount; fractions, simple and complex; decimals; percentage, alligation; ratio and proportion. Metric System.

### English

The candidates are expected to correct samples of bad English, for spelling, punctuation, capitalization, grammar and sense; also to write a short composition on a given familiar theme.

*Commencing with June 1908, applicants for admission must show familiarity with the following books:*

*Shakespeare's The Merchant of Venice; Sir Roger de Coverley Papers in the Spectator; Irving's Life of Goldsmith; Coleridge's The Ancient Mariner; Scott's Ivanhoe and Lowell's The Vision of Sir Launfal; George Eliot's Silas Marner; Burke's Speech on Conciliation with America.*

*Subjects for the theme will be taken from the above mentioned books and the candidate will be expected to answer questions concerning the lives of the authors and principal historical events associated with the books. The composition will be judged from its correctness in spelling, punctuation, grammar, idiom and paragraphing. The student will be judged by how well he writes rather than how much he writes.*

### Geography

Location of principal countries, with capitals, large rivers, mountains, etc., noting characteristics of climate, productions and inhabitants. General statements rather than specialization are sought.

### American History

*Beginning with June 1908, applicants for admission must show proficiency in American History covering the period from the settlements of the Thirteen Colonies to the present time. Johnston's High School History of the United States will serve in securing a satisfactory preparation.*



## **Algebra**

Fundamental operations, parenthesis, factoring; highest common factor; least common multiple; fractions, simple and complex; simple equations, one or more unknown quantities; radicals; involution and evolution; square and cube root; logarithms; ratio and proportion; exponents, including fractional and negative.

## **Plane Geometry**

As much plane geometry as is included in any of the generally accepted text books. The student should be familiar with properties of plane rectilinear figures, the measurement of angles, the circle, polygons, etc.; applications to the measurement of lines and plane figures.

## **Preparation**

Particular stress is laid upon a thorough grounding in mathematics including Algebra, Arithmetic and Plane Geometry, as these form the basis upon which the work of this school rests. A preliminary course in science, including Physics and Chemistry serve to prepare the student's mind for the higher branches of these subjects and their application.

## **Advanced Standing**

Candidates who may have received previous training in any of the subjects ordinarily taken in the regular course may present themselves for examination as per calendar. If a satisfactory rank be attained, they will be given such further work as will be best suited to their advancement.

## **GENERAL INFORMATION**

### **Fees**

The fee for the day course is \$100 per year for residents of Massachusetts. For non-residents the fee for the course is \$150 per year.

Three-fifths of the fee is charged for a single term and is payable on or before October 10, the balance on or before February 10, of each year. After payment is made, no fee or part thereof can be returned, except by special action of the Trustees.

Students must provide their own books, stationery, tools, etc., and pay for any breakage or damage that they cause. The above fee includes free admission to any of the evening classes in which there is accomodation, should any day student desire to attend.

For all first year students a minimum deposit of \$20 is required to cover the cost of breakage in the chemical laboratory, the unexpended balance to be returned to the student at the end of the year.



The fees for the evening classes are indicated under Evening Classes. Fees are strictly payable in advance, and students whose fees remain unpaid after the above mentioned dates will not be admitted to classes.

### **Examinations**

Examinations are held at the end of each term.

In general, the examinations cover the work of the preceding term, but at the end of the third year, candidates for diplomas may be examined on all the preceding three years' work.

Intermediate examinations are held every five weeks and these serve to inform the student as to the progress made.

Daily work and regularity of attendance are considered in making up the reports of standing.

Continued or persistent absence (or tardiness) from the classes is considered reason to exclude a student from the class.

### **Thesis**

All candidates for the diploma of the school must file with the Principal not later than May 15, a report of original investigation, or research, written on a good quality of paper, 8x10 inches, with one inch margin at left, and 1-2 inch at right of each page; such thesis to have been previously approved by the head of the department in which it is made.

### **Graduate Course**

Graduates of technical courses of other schools are invited to communicate with the Principal with reference to special courses in the textile studies. Previous training in the engineering branches will usually reduce materially the time necessary to complete any of the courses at this school. The advantages offered to such persons for special research work are unexcelled, and a most profitable course may be arranged.

### **Diploma**

The diploma of the School is awarded upon the satisfactory completion of the regular course, covering not less than three years, except where entrance is to advanced standing. In such cases at least one year's attendance is required.

## EVENING COURSE

The Evening Courses are free to residents of Lowell. All applicants must present satisfactory credentials showing that they are graduates of a Grammar School or school of higher standing, or they must pass entrance examinations in Arithmetic and English. For the first subject a short composition must be written on a given theme, and a certain amount must be written from dictation. In arithmetic the applicant must show suitable proficiency in addition, subtraction, multiplication, division, common and decimal fractions, percentage, ratio and proportion.

Of the courses offered to Evening Students at Lowell Textile School, the following will be of interest to those connected with the woolen or worsted industry.

- II. (a) Woolen Spinning—1 year.  
(b) Worsted Spinning—3 years.
- III. Designing—4 years.
- V. (b) Woolen and Worsted Weaving—1 year.  
(c) Dobby and Jacquard Weaving—1 year.
- VII. Woolen and Worsted Finishing—1 year.

List of subjects embraced in each course is similar to that of the day.

For the satisfactory completion of any of the above numbered courses, the certificate of the school will be awarded; the diploma of the school will be awarded in exchange for certificate of satisfactory completion of those subjects which go to make up any one of the regular diploma courses.

Fee for each course for all except residents of Lowell, is \$5 per year.

November, 1907

# BULLETIN

OF THE

## Lowell Textile School

LOWELL, MASS.

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*Issued Quarterly*

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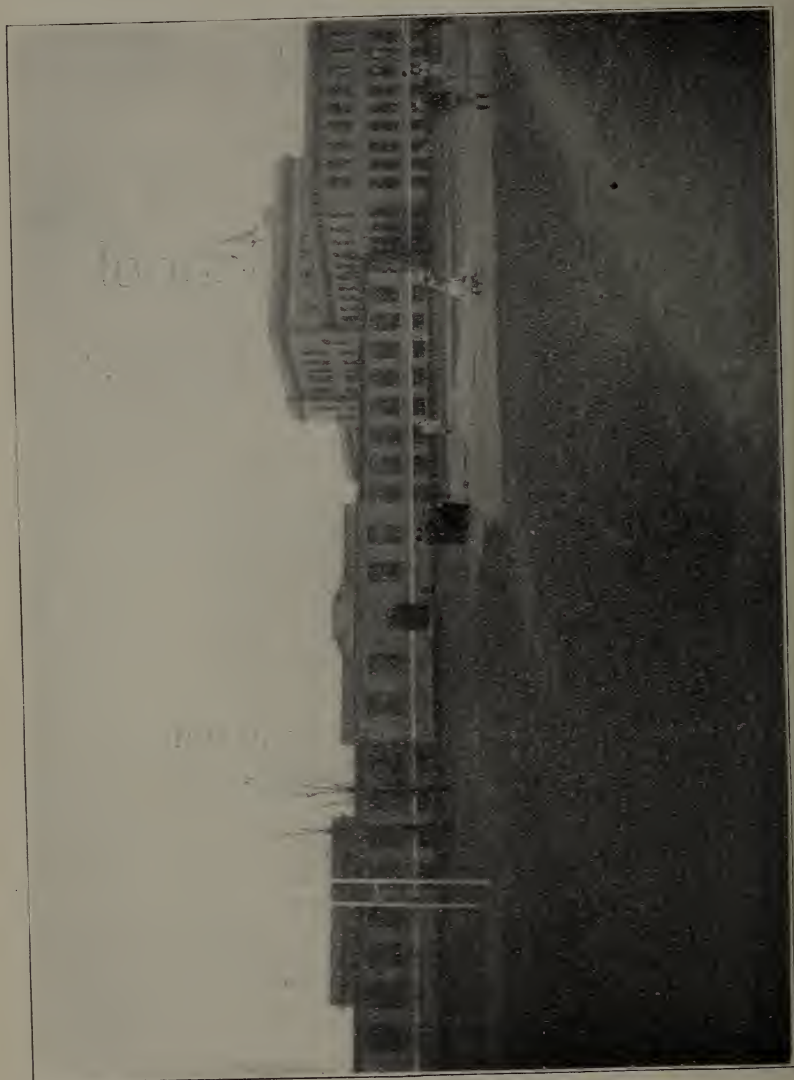
### Special Bulletin on the Cotton Manufacturing Course

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Entered August 26, 1902, at Lowell, Mass., as second class matter,  
under act of Congress of July 16, 1894.

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*Moody Street and Colonial Avenue*



KITSON HALL - COTTON YARN DEPARTMENT

YARN DEPARTMENT - KITSON HALL

## Officers of the Lowell Textile School

---

A. G. CUMNOCK, *President*

JAMES T. SMITH, *Clerk*

JACOB ROGERS, *Vice-President*

A. G. POLLARD, *Treasurer*

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matriculates

#### *Cotton Spinning*

FRANKLIN NOURSE, Chairman

WILLIAM E. HALL

#### *Chemistry and Dyeing*

THOMAS WALSH, Chairman

FREDERIC S. CLARK

#### *Decorative Art*

JAMES T. SMITH, Chairman

FREDERICK LAWTON

#### *Designing, Weaving and Finishing*

FREDERIC S. CLARK, Chairman

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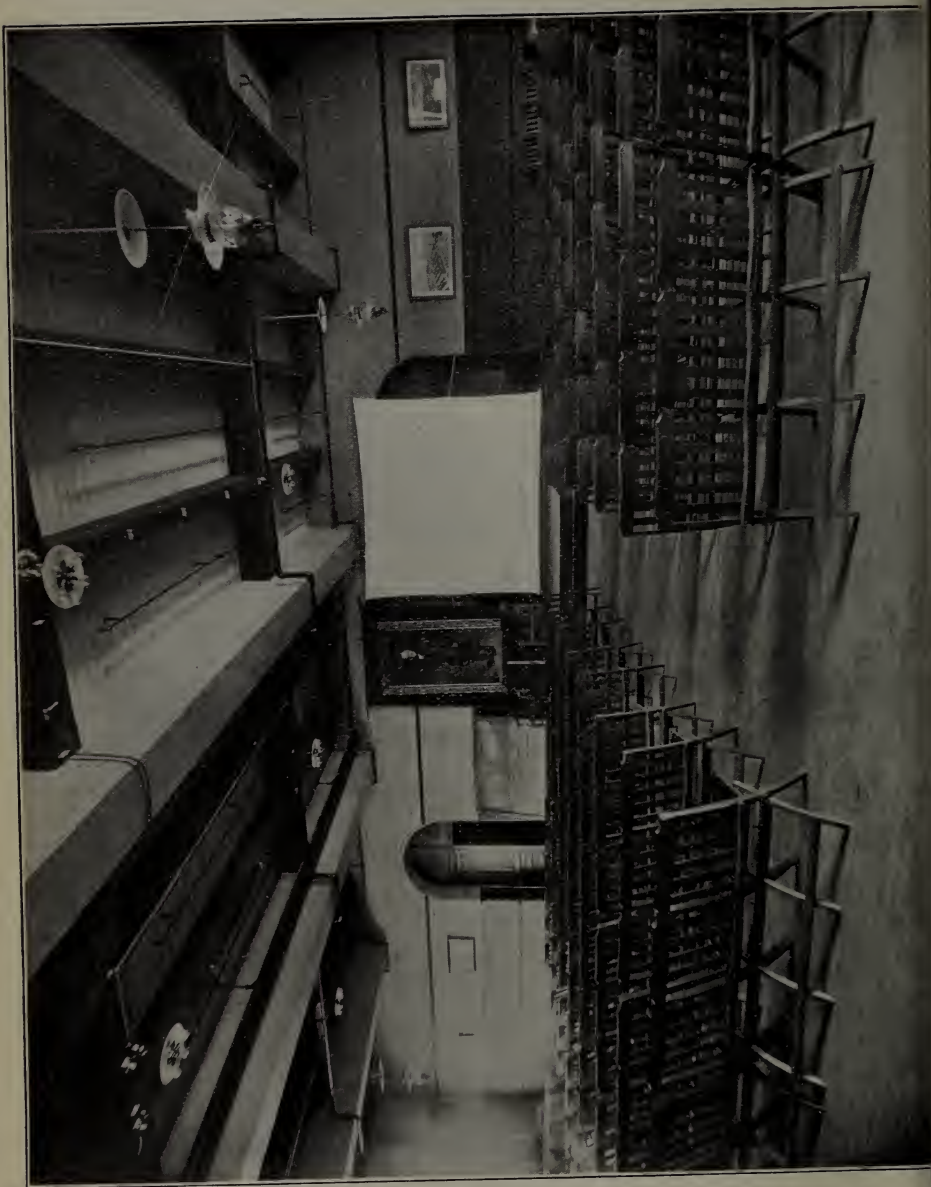
HAVEN C. PERHAM

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CHARLES H. EAMES, S. B., Principal

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For bulletin and terms address Charles H. Eames, Principal





## OFFICERS OF INSTRUCTION

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### Cotton Manufacturing Course

STEPHEN E. SMITH

Chief of Departments of Cotton Yarns and Knitting

JAMES G. COMAN,

Instructor in Cotton Yarns

Other Department Heads giving instruction to students of the course

FENWICK UMPLEBY,

Chief of Design and Power Weaving Department

LOUIS A. OLNEY, A. C., Professor of Chemistry.

Chief of Chemistry and Dyeing Department

GEORGE H. PERKINS, S. B.,

Chief of Engineering Department

EUGENE W. CLARK, JR.,

Instructor in Decorative Art and Free-hand Drawing.

PAUL E. KUNZER, Ph. D.,

Instructor in Commercial Languages

FREDERICK A. WOOD, Ph. D.,

Instructor in English.



## INTRODUCTION

It was in the year 1790, when Samuel Slater, the virtual founder of the cotton industry in America, came to Pawtucket, R. I., and reproduced from memory the machinery then used by Richard Arkwright in England. His first cotton mill was built at Webster, Mass. With machinery of the most crude pattern and workmanship, only the manufacture of coarse goods was possible, and accordingly the American cotton industry was started along these lines of least resistance.

The ingenuity of American machinists together with the skill acquired by years of experience on the part of the operative, have raised the industry from its humble beginning and placed it upon a high plane among the important industries of the country. Step after step has been taken in the improvement of machinery and processes until today the product of our mills on medium grades of work rivals that of mills in older and more experienced countries. There yet remains, however, much room for improvement along lines of the highest endeavor, namely the production of the finest cotton yarns and fabrics.

One of the monthly bulletins of Commerce and Finance, published by the Department of Commerce and Labor, gives some interesting figures regarding the value of imported cotton goods showing what ample opportunity there is in this field of labor, as compared with other lines of textile work. For the seven months ending July, 1907, the value of manufactured textile fabrics imported was as follows:

Cotton Goods	\$46,061,471.00
Flax and other Vegetable fiber Goods	40,359,945.00
Silk Goods	24,581,777.00
Woolen Goods	13,859,572.00

New mills are continually being erected and the general tendency is to produce the higher grades of cotton yarn and cloth. This line of work offers a larger field and greater returns.

Like all other industries the methods used in the early days of cotton manufacturing were determined by rule of thumb, and it is only within a comparatively recent time that any attempt has been made to standardize methods and processes. The introduction and growth of the Textile School has materially assisted in this movement. Under the influence of technically trained minds the industry is gradually undergoing a change and offers to young men of integrity and ability, the best of opportunities for advancement.

## OBJECT

The object of the Cotton Manufacturing Course is to give a young man a thorough theoretical and practical training in all branches of the industry. The course as it stands today is the result of many years of study, practice and experience upon the part of the instructors in each department. It is designed particularly for students contemplating a career in the manufacture of cotton yarn and cloth, or in allied industries and includes instruction in the subjects, for detail of which see pages following.

During the first term of the first year, the studies are common to all courses and include instruction in elementary mechanism, mathematics, mechanical drawing, general chemistry and decorative art. Laboratory work supplements the lectures in chemistry and hand loom weaving assists in illustrating the principles of textile design.

The work in the Cotton Yarn Department comprises instruction in all the processes from the bale to the finished yarn. The instruction consists of lectures upon the machines and processes, and laboratory work upon the machines themselves. In the laboratory each student is required to make exhaustive tests upon each machine and all the settings and adjustments possible. The third year's work in this department is largely devoted to lectures upon the manufacture of specialties, waste products, etc., and special laboratory work, special tests upon yarns and fabrics, mill planning with regard to the arrangement of machinery and other work of an advanced nature.

The course in chemistry consists of lecture and laboratory work on inorganic chemistry followed by instruction in textile chemistry and dyeing, including a short course in the dyeing laboratory.

The work in mechanism is followed by steam engineering, electricity, hydraulics and mill engineering. The mechanical drawing taken in connection with these subjects augments this instruction as well as provides opportunity for students to become skilled in draughting.

The course in designing, cloth analysis, and cloth construction includes lectures on plain and fancy weaves and Jacquard work, the analysis of all commercial fabrics, and designs for the same. During the third year of this course students in this department specialize on cotton fabrics.

Power weaving is taken up during the second and third years. Commencing with lectures and practice upon plain looms, the student is carried on through dobby, box-loom and Jacquard weaving.

A course in knitting taken during the third year includes the manufacture of hosiery and underwear. There is also a course of lectures on the finishing of cotton fabrics.

# COURSE I.—COTTON MANUFACTURING

## FIRST YEAR

### FIRST TERM

	Hours of Exercise		Hours of Exercise
Elements of Mechanism	60	Freehand Drawing and	
Mechanical Drawing	112	Decorative Art	15
Mathematics,—Algebra	30	English	15
Hand Loom Weaving and		German	20
Elements of Design	55		
General Inorganic Chemistry	187		

### SECOND TERM

Cotton Manipulation	120	Textile Chemistry	15
Textile Design, Cloth Analysis	60	Freehand Drawing and Decorative	
Hand Loom Weaving	55	Art	30
Elements of Mechanism	60	Mechanical Drawing	75
Trigonometry	30	Language (German)	20
General Organic Chemistry	30	English	15

## SECOND YEAR

### FIRST TERM

Cotton Spinning	240	Mechanical Engineering	30
Textile Design, Cloth Analysis	60	Power Loom Weaving	45
Textile Chemistry and Dyeing	30	Physics	30
Machine Drawing	40	Industrial History	15

### SECOND TERM

Cotton Spinning	142	Power Loom Weaving	97
Textile Design, Cloth Analysis	60	Machine Drawing	40
Textile Chemistry and Dyeing	97	Physics	30
Mechanical Engineering	30	Industrial History	15

## THIRD YEAR

### FIRST TERM

Cotton Spinning	225	Knitting Machinery	45
Textile Design	30	Power Loom Weaving	135
Cloth Analysis	60	Mill Engineering	30

### SECOND TERM

Cotton Spinning	180	Mill Engineering	45
Textile Design, Cloth Analysis	60	Knitting Machinery	45
Power Loom Weaving	142	Physical Laboratory	30
Thesis			







## COTTON YARN DEPARTMENT

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### Outline of Instruction in departments attended by a student in the Cotton Manufacturing Course

#### *Cotton Fiber*

- Development of Cotton Spinning Machinery.
- Botanical Varieties—Their Classification and Characteristics.
- Commercial Varieties—Classifications, Characteristics and Adaptatives
- Microscopical Examination of Various Cottons.
- Points Considered in Judging Cotton,—Dampness, Color, Uniformity, etc.
- Grading and Stapling—American, Egyptian and Sea Island Cottons.
- Methods of Cultivation and Marketing.
- Ginning—Construction, Operation and Advantages of Saw and Roller Gins.
- Baling,—Various forms of Baling Presses and their Products, Characteristics of each.
- Mixing—Object and Methods of Mixing for Per cent., Grade, Variety and Color Mixtures.
- Classifications of the Processes of Yarn Manufacture.

#### *Opening and Picking*

- Construction and Operation of various machines used in opening and picking cotton, Hopper Bale Breaker, Opener, Automatic Feeder, Breaker, Intermediate and Finisher Pickers, Waste Openers and Cleaning Machines.
- Details of Construction—Cleaning Trunks, Evener Motions, Types of Beaters, Grids and Screens, Lap Measuring Motion, Safety Stop Motion.
- Details of Operation—Regulation of the Air Current, Character and Regulation of the Waste, Drafts of Intermediate and Finisher.
- Adjustment of Feeder, Grid Bars, Lap Racks and Feed Rolls.
- Causes of and Remedies for—Uneven laps, Split laps, Ragged selvages, Dirty laps, etc.
- Cleaning and Oiling.

#### *Carding*

- Object and Principles of Carding.
- Construction and Operation of Revolving Flat, Wellman, Foss & Peavey and Roller and Clearer Cards.
- Details of Construction—Feed Plate and Roll, Screens, Flats, Doffer, Combs, Coiler, Mote-knife, etc.



COTTON YARN DEPARTMENT—FLY FRAMES

Card Clothing—Various forms of Foundation, Wire, Method of Setting, Number of Points per square foot, Shape and Size of Wire, Methods of Grinding, Method of Cutting Tape and Clothing Cylinder, Doffer and Flats.

Details of Operation—Method of driving various parts, Stripping, Grinding and Burnishing, Setting of various parts, Draft, Speeds and Production, Temperature and Humidity.

Care of Carding Machinery, defects in quality of work and remedies for same.

Character and Regulation of waste.

Sample Carding by hand of at least twelve different blends.

### *Drawing*

Theory of Drawing.

Effect of the Doublings.

Construction and Operation of the Drawing Frame.

Details of Stop Motions, Mechanical and Electrical and advantages of each.

Details of Drawing Rolls, Solid and Shell, Common and Metallic.

Metallic Rolls—Construction, Operation and Advantages.

Roll Covering—Materials used, Roller Cloth, Selection of leather for various kinds of work, Methods of applying leather covering.

Roller Varnish—Its object and methods of applying, recipes for same.

Roll weighting for Common and Metallic Rolls.

Setting of Drawing Rolls for Long and Short Staple, Heavy and Light Slivers, etc.

Minor Details—Clearers, Traverse Motion, Weight Relieving Motion, Trumpets and Condensing.

Amount and proportioning of drafts and tension.

Construction and Operation of Railway Head.

Details of Evener Motion, Stop Motions, etc.

Care of Drawing Machinery, Roller scouring, Cleaning and Oiling, Sizing of sliver, cut sliver and remedies for same.

### *Roving Processes*

Reeling, Weighing and Numbering of Roving by English and Metric Systems.

The Development of the Fly Frame.

Details of Construction of Slubber, Intermediate, Fine and Jack Fly Frames.

Details of the regulation of Draft, Twist, Lay and Tension on fly frames.

Amount of Twist for various cottons and methods of obtaining same.

Builder Motions—English and American types and methods of setting and adjusting.



Proportioning and amounts of draft and roller setting.  
 Creeling, Piecing, Doffing, Cleaning and Oiling.  
 Stop Motions—Full bobbin, Safety stop, Back stop motion, Single Roving Stop Motion.  
 Details of Winding and the Regulation of the Tension.  
 Study of the Differential Motion and its work in the Fly Frame.  
 Study of the Functions and Development of the fly frame Cones.  
 Defects in adjustment and product of roving machinery and remedies for same.

### *Ring Spinning and Twisting*

Theory of Spinning.  
 Classification of yarns in regard to uses, Materials, Varieties and Twist.  
 Reeling, Weighing and Numbering of single and ply yarns.  
 Construction and Operation of the Ring Frame.  
 Consideration of Spinning details, thread guides, separators, traveller cleaners, warp and filling bobbins, space of spindles, drum and bands, roving traverse, etc.  
 Rolls and roll setting, weighting, single and double boss, amount and proportioning of draft for various yarns.  
 Twist and twist gearing, Amounts for warp, filling and hosiery yarns, ply yarns, etc.  
 Rings and Travellers, Kinds and methods of determining correct size for various yarns.  
 Comparison of Single and Double Roving in Spinning.  
 A Study of the development of the modern Spindle.  
 The Spinning Builder—Study of the\*Warp Filling and Combination Builder Mechanisms.  
 Calculations for Speed, Draft, Twist, etc.  
 Methods of preparing yarn for Twisting.  
 The Spooler and Multiple Winder.  
 Operation of Ring and Flyer Twistern.  
 A Study of the Wet and Dry Twisting Processes.  
 Care of the rolls, spindles, bands, doffing.  
 Uneven, cut and cockled yarns and remedies for same.

### *Combing*

Object of Combing.  
 Kinds of cotton combed and classes of goods requiring combed yarns.  
 Preparing cotton for Combing, Drawing frame, Sliver lapper, Ribbon Machine.  
 Combinations of preparatory machines and details of operation.  
 A study of the Heilmann Comber and its operation, Feed Motion, Nippers, Cylinders, Detaching Mechanisms, Draw-box, Draft, Waste and Production, Single and Double Nip Machines.





COMBING



Setting and Timing the Comber, Regulation of Waste and Production, Weight of lap, etc.

A Study of the Alsation Comber and its Operation.

A Study of Nasmith Comber and its Operation.

Care and management of Combing Machinery.

### *Mule Spinning*

A Comparison of Throstle, Ring and Mule Spinning and the Products of each Machine.

Advantages and Disadvantages of each machine.

Construction and Operation of the Self-acting Mule.

Details of Operation, Drawing and Twisting, Backing Off, Winding, Re-engaging.

Details of Constuction, Builder Motion, Quadrant, Roller Motion, Nosing Motions, Jacking Motions, etc.

A Study of Building and Winding.

Calculation of Draft, Twist, Drag, Production.

Causes of and remedies for, Kinky yarn, Soft cops, Ridgy cops, Uneven chase, etc.

### *Organization*

Methods of handling Cotton Waste, Details of the manufacture of Cotton Wadding and other Waste Products.

Details of Fine Yarn Spinning, the manufacture of Sewing Thread, Lace Yarns, Twines and Cords.

The Manufacture of Fancy Yarns, Nub, Soop, Splash, Spiral Yarns, Flake Yarns, etc.

Factory Organization for various sizes and styles of yarns, Equipment, Programs, Balance of Production, Cost of Machinery, Power, etc.

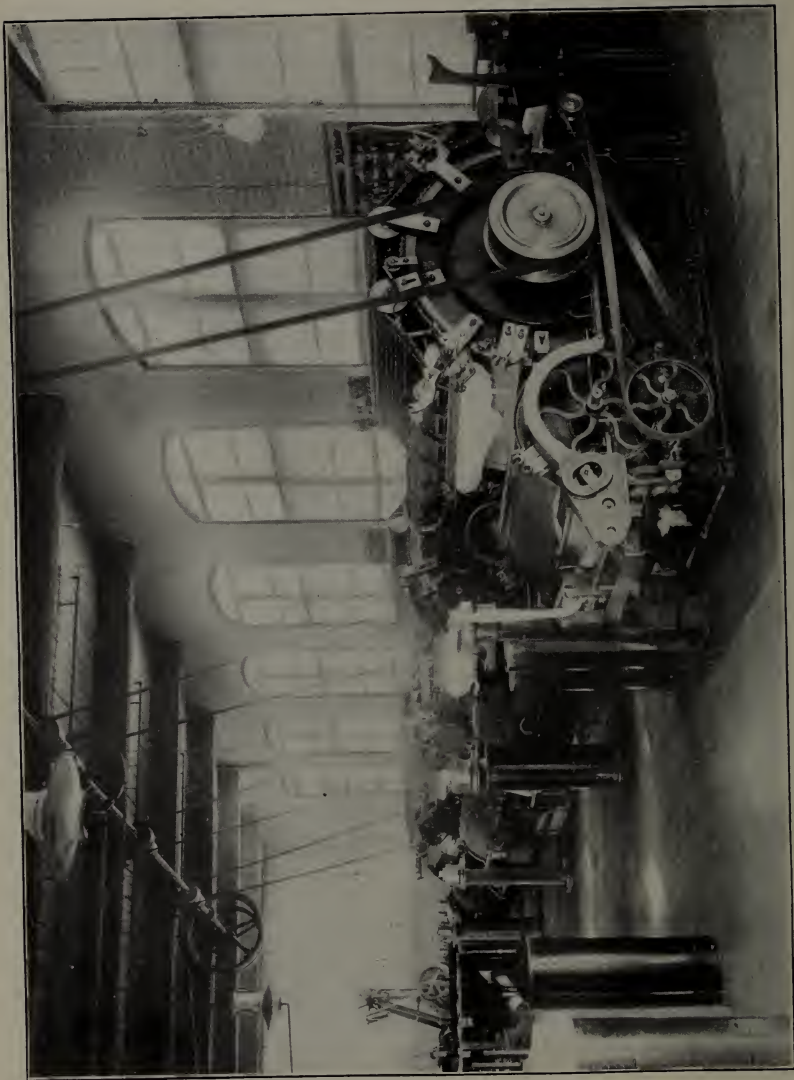
The Economic Arrangement of Cotton Machinery.

Life of Cotton Machinery, Depreciation and Valuations.

Factory Cost Systems, Inventory, Productive and Non-Productive Labor, Supplies, Maintenance, General Expenses, etc.

### **Knitting Department**

The course in Knitting is designed to meet the needs of those requiring special work in this branch, as well as those desiring only a general knowledge of the subject. The course begins with lectures upon the yarns used and the preliminary operations, and continues with the construction and operation of the various makes of knitting machines as applied to circular and flat knitting.



CARDING

Beginning with the hand stocking frame, the student is given instruction upon the machines used for hosiery and the flat machines used in the manufacture of gloves, sweaters and jackets.

Following is a list of subjects taken up:

Knitting Yarns and Their Manufacture.

Operations preliminary to Knitting.

Winding—Cone Winding.

Development of Knitting.

Knitting Needles—Their Construction and Operation.

Latch Needles, Spring Needles.

Method of Producing Standard Stitches.

Study of the Plain, Rib and Tuck Stitches and their Uses.

Circular and Flat Knitting Machines.

Operations involved in the Manufacture of Seamless Hosiery.

Study of the Production of the Rib Top.

Details of Construction and Operation of the Circular Rib Knitting Machine, including a consideration of Stop Motions, Needle Cams, Pattern Wheels, Splicing Attachments, Measuring Devices, etc.

Transferring of Rib Tops.

Details of Construction and Operation of the Seamless Hosiery Machine, including a study of Stop Motions, Plaiting Attachments, Pattern Wheels and Chains, Shaping the Heel and Toe, Reinforcing the Heel and Toe, Loosening the Stitch for Reinforcing and Shaping, Semi, Three-quarter and Full Automatic Hosiery Machines.

Construction of the Looper and Study of its Operation, Regulation of Tension, etc.

Designing on Seamless Hosiery Machines—Study of the Production of Fancy Stitches, Designing by Means of Colored Threads.

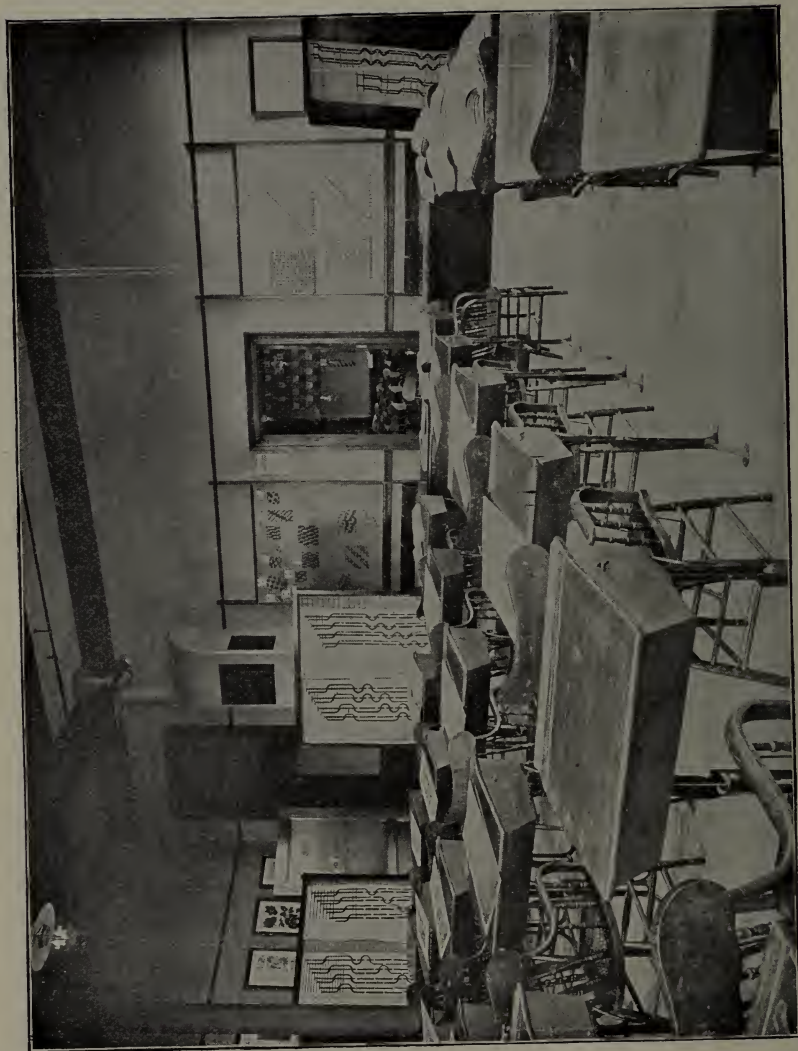
Sizes of Yarn for Various Work and Gauges.

Study of the Finishing of Hosiery—Washing, Dyeing, Boarding, Mending, Pressing, Pairing, Stamping, etc.

Imperfections in Circular Knit Goods and Remedies for Same—Dropped Stitches, Curled Work, Ragged Edges, Stains, Streaked Work, etc.

A Study of the Flat Knitting Machines—The Lamb Principle as applied to Glove and Sweater Manufacture.

The Jacquard as applied to Flat Knitting Machinery.



TEXTILE DESIGN DEPARTMENT

**The instruction in Textile Design and Cloth Analysis  
is given by the Department of Textile Design and Power Weaving,  
an outline of which is as follows:**

**FIRST YEAR**

*Design Lectures*

Point or design paper, intersections, interlacings and cut sections, color effects, reeds and setts, different systems of counting reeds and yarns, twills and diagonals, drafting and reduction, sateen weaves, cut weaves, combination of weaves, spot weaves, plain fabrics and fabrics on a plain basis, names and explanations of different parts of cloth, terms applied to weaves, etc., classifications of fabrics.

*Cloth Construction and Cloth Analysis*

Reproduction of fabrics, planning of patterns, drafts, chains, etc., on paper, including yarn and cloth calculations as follows:

Relative sizes of yarns, grading of woolen yarns, woolen yarn calculations, methods of finding weight of various lengths of fabrics, calculations for finding sizes of yarns of various denominations, worsted yarn calculations, cotton yarn calculations, calculations for folded or ply yarns, calculations for converting one system of yarns into that of another, calculations for finding weight, counts or length of warp or filling from given data, calculations for reeds.

*Practical Work*

Color effects, combinations of colored threads, combination of weaves, figured designing on plain ground, figured designing on twill ground, cut diamonds, checkerboard effects, herringbone stripes, checked goods, colored goods, stripes, drafting of designs, designing from chains and drafts, practical work on hand looms putting into operation the principles taught in the foregoing course, including dressing, beaming, drawing in and reeding of warps.

**SECOND YEAR**

*Design Lectures*

Twilling, fancy twills, point drafts, double, triple and alternate drafts, lined work, damasks, fancy stripes, sateen stripes, plain and irregular rib weaves, oblique rib weaves, basket weaves, corkscrew and double twill weaves, broken twills, backed cloths, filling and warp, double cloths, multiple ply fabrics, cloths ornamented with extra warp or filling, piques and Welts, bedford cords, marseilles quilting, fancy woolen cassimeres, figured blankets, crepes, trouserings, carriage robes.



### *Cloth Construction and Cloth Analysis*

- Calculations for harness straight, centered or point.
- Calculations for shrinkage or contraction.
- Calculations to find the number of ends per inch in order to use a given weight of warp, also picks per inch to use a given weight of filling.
- Calculations on the proportioning of fabrics.
- Construction and balance of cloth.
- Amount of material used in the construction of fabrics.
- Analysis of samples includes cotton dress goods, gingham, fancy dress goods, backed and double cloths.
- Calculations for complete specifications of backed and double cloths based upon the structure of cloth.

### *Practical Work*

- Analysis and reproduction of fabrics; planning patterns, drafts, chains, etc., on paper, including all necessary calculations for loom and finished cloth. Original designing on all design lectures.
- Lectures on Color cover the theory of color as applied to textiles, color values, the combination of colors, and the coloring of plaids and checks, suitings, gingham, tartans and stripes.

## THIRD YEAR

### *Design Lectures cover*

Cotton Velvets, Corduroys, cotton pile fabrics, cut and uncut, figured Matelasse, shawls, cotton plushes, Chinchilla, worsted and mohair mantle cloths, figured double plains, reversibles, ingrain, tapestries, cotton gauze, cotton leno, cotton lappet, Jacquard designing, distribution of figures, determination of area occupied by figures, Jacquard figures formed by the warp or filling, figures not square, cloth formed by the combination of Jacquard gauze, and fancy harness weaves, special designs for Jacquard gauze, and pile fabrics, Jacquard pile and ordinary weaves, vestings, golfings, the principles of designing, cloth structure and coloring best adapted to each of the above fabrics.

### *Cloth Construction and Cloth Analysis*

- The structure and analysis of all descriptions of compound fabrics, viz:—backed, double, and various types of Jacquard figured fabrics, especially applicable to the cotton and worsted industries.
- The cost of mixing and blends.
- The cost of ply yarns.
- The metric system.



### *Practical Work*

Original designs on the foregoing lectures.

The complete analysis of a fabric.

Practical work on hand looms and putting into operation the principles taught in the foregoing course.

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The instruction in Chemistry and Dyeing as applicable to Cotton Manufacturing is given by the Department of Chemistry and Dyeing

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### **Elementary Chemistry**

This subject is required of all students intending to take a complete course and receive the school diploma.

It includes lectures, recitations, and a large amount of individual laboratory work upon the following subjects, and extends through one entire year:—

#### *Chemical Philosophy*

Chemical action, chemical combination, combining weights, atomic weights, chemical equations, acids, bases, salts, Avogadro's law, molecular weights, formulas, valence, periodic law, etc.

#### *Non-Metallic Elements*

Study of their occurrence, properties, preparation, chemical compounds, etc.

#### *Metallic Elements*

Study of their occurrence, properties, metallurgy, chemical compounds, etc.

#### *The Hydrocarbons and their Derivatives*

Study of their occurrence, properties preparation, uses, etc. This work although elementary in character is of sufficient breadth to prepare the student understandingly for the work with the artificial dyestuffs which follows.

### *Qualitative Analysis*

Before the completion of the course, the student takes up as thoroughly as the time will permit, the qualitative detection of the more common metals and non-metals, with practical work.

## **Textile Chemistry and Dyeing**

Under this head is included first, the lecture course in Textile Chemistry and Dyeing, which is taken by all regular diploma students; second, the general laboratory course taken by all regular diploma students.

### OUTLINE OF LECTURE COURSE

#### *Technology of Vegetable Fibres*

Cotton, Linen, Jute, Hemp, China Grass, etc. Chemical and physical properties, chemical composition, microscopical study, and their action with chemicals, acids, alkalies, heat, etc.

#### *Technology of Animal Fibres*

Wool, Mohiar, Silk, etc. Chemical and physical properties, chemical composition, microscopical study, and their action with chemicals, acids, alkalies, heat, etc.

#### *Technology of Artificial Fibres*

Study of the various forms of artificial silk, the process of manufacture, their properties and action with chemicals, acids, heat, etc.

#### *Operations Preliminary to Dyeing*

Bleaching of cotton and linen, wool scouring, bleaching, fulling and felting of wool, carbonizing, silk scouring and bleaching, action of soap.

The bleaching of cotton cloth, yarn and raw stock is studied at length with detailed descriptions of the various forms of kiers and machinery used; also the action of the chemicals used upon the material and the various precautions that must be taken in order to insure successful work.

#### *Water and its Application in the Textile Industry*

Impurities present, methods of their detection, their effect during the different operations of bleaching, scouring, dyeing and printing, and the methods for their removal or correction.

The important subject of boiler waters is also studied under this heading with a full discussion of the formation of boiler scale, its disastrous results and the methods by which it may be prevented.

### *Mordants and Other Chemical Compounds used in Textile Coloring not Classified as Dyestuffs*

Theory of mordants, their chemical properties and their application, aluminum mordants, iron mordants, tin mordants, chromium mordants, organic mordants, tannin materials, soluble oil, fixing agents, levelling agents, assistants, and numerous other compounds not dyestuffs that are extensively used in the textile industry.

Under this heading is included the definitions of various terms and classes of compounds, used by textile colorists, such as color lakes, pigments, fixing agents, developing agents, mordanting assistants, mordanting principles, levelling agents, etc.

### *Theory of Dyeing*

A discussion of the chemical, mechanical, solution and absorption theories, and the various views that have been advanced by different investigators of the chemistry and physics of textile coloring processes.

Under this heading is discussed the general methods of classifying dyestuffs and definitions of such terms as textile coloring, dyeing, textile printing, substantive and adjective dyestuffs, monogenetic and polygenetic dyestuffs, etc.

### *Natural Coloring Matters*

Organic, properties, and application of indigo, logwood, catechu or cutch, Brazil wood, cochineal, fustic, tumeric, madder, quercitron bark, Persian berries, and other natural dyestuffs that have been used within recent years by textile colorists.

### *Mineral Coloring Matters*

Under this heading is discussed the properties of such inorganic coloring matters and pigments as chrome yellow, orange and green, Prussian blue, manganese brown, iron buff, etc.

### *Artificial Coloring Matters*

General discussion of their history, nature, source, methods of manufacture, methods of classifications, and their application to all fibers.

Special study of:—

Basic Coloring Matters.

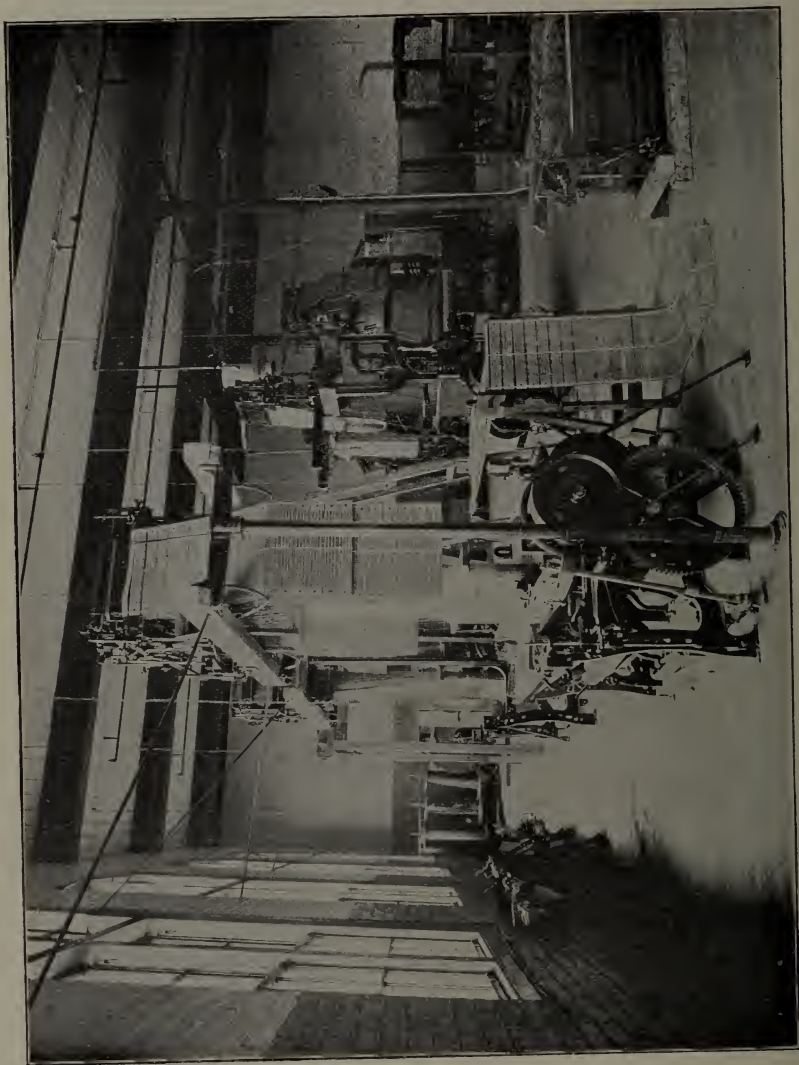
Phthalic Anhydride Colors, including the eosins, phloxines, etc.

Acid Dyestuffs.

Janus Colors.

Direct Cotton Colors.

Sulphur Colors.



JACQUARD SECTION OF WEAVE ROOM

Mordant Colors, including the alizarines and other artificial coloring matters requiring metallic mordants.

Mordant Acid-Colors.

Insoluble Azo Colors, developed on the fiber.

Reduction Vat Colors, including Artificial Indigo, Indanthrene, Flavanthrene, Viridanthrene and Melanthrene.

Aniline Black and other artificial dyestuffs not coming under the above heads.

As each class of dyestuffs is taken up, the detail of the methods of applying them upon all the different classes of fabrics and in all the different forms of dyeing machines are thoroughly discussed; also the difficulties which may arise in their application, and the methods adopted for overcoming them.

### *Machinery used in Dyeing*

A certain amount of time is devoted to the description of the machinery used in the various processes of textile coloring, which is supplemented as far as possible by the use of charts, diagrams, lantern slides, etc.

Most of the important types of dyeing machines are installed within the dyehouse of the School and the students can be taken directly from the lecture room and shown the machines in actual operation.

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**The instruction in Weaving and Warp Preparation and the practical work upon the loom comes under the charge of the Department of Textile Design and Power Weaving.**

### *The practical part of the work includes*

The process of making pattern warps.

The construction and use of Spooling and Quilling Machinery for cotton.

The construction and use of Warpers of various kinds.

Long and short chain systems of preparing warps and filling.

Sizing materials and size mixing machinery.

Drawing-in and Twisting.

Operation of machines named above, and warp preparation in cotton, adapted to correspond with the respective lecture.

The plain power loom and its construction, shedding by cams, various pickers and picking motions, force of lay, take up and let-off motions, minor adjustments of the power loom, plain looms as altered for weaving fancy cloth, looms constructed for several shuttles, drop box motions,





MECHANICAL ENGINEERING CLASS ROOM



variety of cams for different grades of work, principles of beating-up motion, adjusting lag to various grades of cloth, different makes of box motions, applied to gingham weaving, chain building for box looms, shuttle changing looms, shedding motions, double acting dobbies, chain building for dobbies, fan reeds, handkerchief motions, leno weaving, centre selvedge motions, automatic looms, filling changing looms, single acting dobbies, spring boxes and other motions for returning harness, oscillating reeds, lappet motions, various shaker motions, towel and other pile cloth weaving, open and close shed looms, for weaving various grades of woolen and worsted cloths, equal and unequal gear driven looms, lectures on Jacquard machinery, single lift Jacquards, double lift Jacquards, leno Jacquards, Jacquards specially arranged for ingrain carpet work, tying up Jacquard harness, tapestry weaving, quilt weaving, etc., weave room engineering and equipment, cost of weave mill operation and statistics of operation.

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**The instruction in Mechanics, Mechanical Drawing, Steam Electricity and Hydraulics is given by the Department of Mechanical and Electrical Engineering and covers the subjects as listed below**

*Mechanics and Mechanism considers*

Elements of Mechanics, Force, Work, Power and Energy, Measurement of Work and Power, Levers, Toggle Joints, etc., Windlass, Pulley Blocks, inclined Plane and Wedge Screws, Worm and Wheel, Elements of Mechanism, Angular Velocity, Speed Problems, Rolling Cylinders and Cones, Gearing, Pitch of Gears, Belting problems, Link motions, Harmonic motions, Cam Design, Builder motions, Mangle Wheel, Aggregate Combinations, Epicyclic Trains, Different Motions, Graphic Statics.

*Applied Mechanics includes a study of*

The Strength of Materials, Methods of Testing, Trusses, Beams, Columns.

In the topics given will be included as many problems as possible, dealing with the construction and maintenance of mills, not with the purpose of educating mill engineers, but rather to familiarize the student with the means at hand and processes employed in erecting structures for manufacturing, that they may study their government advantageously.

## STEAM AND HYDRAULICS

### Water

- Head and Pressure.
- Measurement of Quantity
- Measurement of Power.
- Dams, Canals, etc.
- Types of Turbines.
- Efficiency of Modern Turbines.
- Methods of Regulation.

### Steam

- Elements of Thermodynamics.
- Types of Boilers.
- Fuels and Combustion.
- Chimneys and Mechanical Draft.
- Mechanical Stokers.
- Steam Piping.
- Boiler Test.

### Steam Engine

- Simple, Compound and Triple Expansion.
- Condensers and Condensing engines.
- Plain side valve.
- Corliss and Cam Gears.
- Methods of Regulation.
- Steam Turbines
- Use of exhaust steam for heating and dye house purposes.

### Indicator

- Construction of and use in measuring power and setting valves.
- Engine test.
- Practical use of indicator and computation of indicator diagrams.

### Gas Engine

- Theory and general principles of gas engines.
- Types of explosion and internal combustion engines.
- Methods of Regulations.
- Consumption and costs of operation.

## ELEMENTARY AND APPLIED ELECTRICITY

- Elementary Electricity.
- Magnetism.
- Electrical Measuring Instruments.
- Dynamo Electric Machines.
- Electric Lighting.
- Principles of Alternating Currents.
- Alternating Current Apparatus.
- Electrical Power Transmission.
- Electrical Testing.

## MILL ENGINEERING

Mill Construction.      Calculations and drawings of modern mill buildings.

- Distribution of power and methods of driving machinery.
- Mill Fire Protection.
- Mill Heating and Ventilation.
- Mill Humidifying.
- Lectures on allied subjects by outside lecturers will be added.

## MECHANICAL AND MACHINE DRAWING

Care and use of Instruments, Geometrical Constructions, Elements of Projections, Isometric Drawings, Sketching from machine details, Working Drawings, Tracings, Blue Print Process.

Mechanism problems, Drawing in connection with course in Mechanism, such as cams, gearing problems and other mechanism designs.

Practical sketching from machines for working detail and assembly drawings.

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## ENTRANCE QUALIFICATIONS

Candidates for admission are accepted upon presentation of properly vouched certificate showing the completion of a regular four year High School course.

All others will be required to pass entrance examinations in Arithmetic, English, Geography, History, Algebra, Geometry, which will be held in June and September of each year.

Details of these examinations are given in the general bulletin of the school.

## Fees

The fee for the day course is \$100 per year for residents of Massachusetts. For non-residents the fee is \$150 per year.

Three-fifths of the fee is charged for a single term and is payable on or before October 10, the balance on or before February 10, of each year. After payment is made, no fee or part thereof can be returned, except by special action of the Trustees.

Students must provide their own books, stationery, tools, etc., and pay for any breakage or damage that they cause. The above fee includes free admission to any of the evening classes in which there is accommodation, should any day student desire to attend.

Fees are strictly payable in advance, and students whose fees remain unpaid after the above mentioned dates will not be admitted to classes.

## Aid to Students

Free scholarships have not been provided for but provision will be made for applicants for the day courses who have the qualifications for matriculation and are properly vouched for, who furnish satisfactory evidence that they are unable at entrance to meet the charges in whole or in part for tuition.

## **Examinations**

Examinations are held at the end of each term.

In general, the examinations cover the work of the preceding term, but at the end of the third year, candidates for diplomas may be examined on all of the preceding three years' work.

Examinations for students conditioned in first term subjects are held in May and examinations for students conditioned in the Final Examinations are held in September following.

If a student fails to clear a condition he may be required to repeat or drop the subject; and he cannot be admitted to subjects dependent thereon.

Intermediate examinations are held every five weeks and these serve to inform the student as to the progress made.

Daily work and regularity of attendance are considered in making up the reports of standing.

Continued or persistent absence (or tardiness) from the classes is considered reason to exclude a student from the class.

## **Reports of Standing**

Twice during each term informal reports are sent to students, or to guardians of such as are not of age; and at the end of each term formal reports are made.

## **Thesis**

All candidates for the diploma of the school must file with the Principal not later than May 15, a report of original investigation, or research, written on a good quality of paper, 8x10 inches, with one inch margin at left, and 1-2 inch at right of each page; such thesis to have been previously approved by the head of the department in which it is made.

## **Diploma**

The diploma of the School is awarded upon the satisfactory completion of the regular course, covering not less than three years, except where entrance is to advanced standing. In such cases at least one year's attendance is required.

## **Medal of Honor**

The National Association of Cotton Manufacturers offers annually a medal to that member of the graduating class from the Cotton Manufacturing course, selected because of his standing and general ability, as best fitted to receive it.

## EQUIPMENT

### Cotton Yarn Department

#### *Ginning*

- One 50 saw gin made by Daniel Pratt Gin Co., Prattville, Ala.
- One Prior Roller Gin.

#### *Opening, Picking and Waste Machinery.*

- One outfit of Kitson Picking Machinery from works of Kitson Machine Co., Lowell, Mass., including:
  - One No. 7 Opener with Automatic Feeder connected\* by Robinson patent Cleaning Trunk to
  - One 40 in. Single Beater Breaker Lapper with Condenser and gauge box feed.
  - One 40 in. Single Beater Intermediate Finisher Lapper with Perham & Davis Sectional Plate Evener, apron to double four laps.
  - One 40 in. Single Beater Finisher Lapper with Perham & Davis Sectional Plate Evener, apron to double four laps, Kirschner Patent Carding Beater.
- One Roving Waste Opener.
- One Thread Extractor.

#### *Carding, Combing and Drawing*

- The following machinery made by the Lowell Machine Shop, Lowell Mass.
  - One Top Flat Card.
  - Three Revolving Flat Cards.
  - Two Railway Heads.
  - Two Drawing Frames.
- From Kitson Machine Co.,
  - Stripping Rolls, etc.
- From the Whitin Machine Works, Whitinsville, Mass.
  - One 40 in. Revolving Flat Card.
  - Card Grinding Rolls.
  - One Ribbon Lapper.
  - One Six Head Comber.
- From the Mason Machine Works, Taunton, Mass.
  - One Sliver Lap Machine.
  - One Comb.

### *Roving, Spinning and Twisting*

From Lowell Machine Shop, Lowell, Mass.

One Slubber

One Intermediate.

One Fine Frame.

One Jack Frame.

Three Ring Spinning Frames.

One Spinning Mule.

One Spooler.

One Wet and Dry Twister.

From the Whitin Machine Works, Whitinsville, Mass.

Two Ring Spinning Frames.

### *Miscellaneous Machinery of this Department includes:*

From Lowell Machine Shop, Lowell, Mass.

One Reel.

One Model Fine Fly Frame.

One Model Fly Frame Compound.

One Model Card Feed.

One Model Flat Grinding Device.

One Model Scroll Setting Device.

From The Universal Winding Co.

One Sis head Universal Winder, for cones, tubes or multiple winding.

From Draper Co., Hopedale, Mass.

One Weeks Banding Machine.

Miscellaneous Machines.

One Yarn Inspection Machine with black boards.

One Barbour Knotter.

Two Yarn Reels and Grain Scales.

One Power Yarn Tester.

One Twist Counter.

### **Knitting Department**

One Mayo "Acme" Full Automatic Seamless Knitting Machine from Mayo Knitting Machine and Needle Co., Franklin Falls, N. H.

One Geo. D. Mayo Full Automatic Seamless Knitting Machine for Geo. D. Mayo Machine Co., Laconia, N. H.

One Brinton Full Automatic Seamless Knitting Machine from H. Brinton Co., Philadelphia, Pa.

One McMichael and Wildman Rib Top Knitting Machine from Wildman Mfg. Co., Norristown, Pa.



- One Wildman Rib Knitting Machine, with Knee and Ankle Splicer and Automatic Stop Motion, Wildman Mfg. Co., Norristown, Pa.
- One Brinton Rib Knitting Machine with Knee and Ankle Splicer and Plaiter from H. Brinton Co., Philadelphia, Pa.
- One Wildman Rib Top Machine with Automatic Stop Motion from Wildman Mfg. Co., Norristown, Pa.
- One Grosser, One Section Jacquard Machine from Grosser Knitting Machine Co., N. Y.
- One Lamb Sweater Machine from Lamb Knitting Machine Co., Chicopee Falls., Mass.
- One Lamb Glove Machine from Lamb Knitting Machine Co., Chicopee Falls., Mass.
- One Branson Stocking Machine from Branson Knitting Machine Co., Philadelphia, Pa.
- One Beattie Looper from Beattie Machine Works, Cohoes, N. Y.
- One Hepworth Looper with Trimming Attachment from J. W. Hepworth and Co., Philadelphia, Pa.
- Five Sewing Machines, including two Shell Stitch Machines and three 2 and 3-thread Overseaming and Crocheting Machines, from Merrow Machine Co., Hartford, Conn.
- Five Sewing Machines, including machines for Overseaming, Double Stitch Covering, Seaming and Welting, Vest Finishing, etc., from Union Special Sewing Machine Co., Boston, Mass.

## Textile Design and Power Weaving Department

### *Cotton Warp Preparation*

- One Spooler, Lowell Machine Shop, Lowell, Mass.
- One Warper, Lowell Machine Shop, Lowell, Mass.
- One Slasher, Lowell Machine Shop, Lowell, Mass.
- One Beamer, T. C. Entwistle Co., Lowell, Mass.
- One Winder, Altemus & Co., Philadelphia, Pa.
- One 400 End Improved Draper Warper, Draper Co., Hopedale, Mass.
- Drawing-in Frames, etc.
- One Pat. Slasher Press Roll, J. Battles & Co., Lawrence, Mass.
- One Pat. Expansion Comb for Warper, T. C. Entwistle Co., Lowell, Mass.
- One Quiller, Johnson & Bassett, Worcester, Mass.
- One Wet and Dry Twister, Draper Co., Hopedale, Mass.
- Set of six inch spools for Warper, Macrodi Fiber Co., Woonsocket, R. I.

### *Power Weaving*

- One 24 Line Hercules Braider.
- One 12 Line Braider.

One Tubular Braider.  
 One Sautach Braider.  
 All made by the New England Butt Co., Providence, R. I.  
 One plain Northrop Loom, Draper Co., Hopedale, Mass.  
 One Improved Northrop Loom, fine sateen, Draper Co., Hopedale, Mass.  
 One Northrop Loom with dobby, Draper Co., Hopedale, Mass.  
 One Plain Print Cloth Loom, Whitin Machine Works, Whitinsville, Mass. To this is attached a Kip-Armstrong Warp Electric Stop Motion.  
 One Side Cam Twill Loom, Whitin Machine Works, Whitinsville, Mass.  
 One Twenty Harness Dobby Loom, Whitin Machine Works.  
 One Five Harness Sateen Loom, Lowell Machine Shop, Lowell, Mass.  
 One Plain Print Cloth Loom, Mason Machine Works, Taunton, Mass.  
 One Harriman Automatic Shuttle Changing Loom.  
 And the following looms made by the Crompton-Knowles Loom Works, Worcester, Mass., and Providence, R. I.  
 One Model Dobby Attachment.  
 One Knowles Gingham Loom, 4 boxes.  
 One Knowles Fancy Cotton Loom, with 20 harness dobby, 4 boxes, for fancy leno work.  
 One Knowles Fancy Cotton Loom, with 25 harness dobby.  
 One Knowles Blanket Loom, with 25 harness dobby, 4 boxes.  
 One Knowles Fancy Loom, with single lift Jacquard.  
 One Knowles Fancy Loom, with double lift Jacquard.  
 One Knowles Fancy Loom, with Jacquard tied up for leno.  
 One Crompton Gingham Loom, 4 x 1 boxes.  
 One Crompton Fancy Loom, 6 x 1, with double cylinder, 20 harness dobby.  
 One Crompton Fancy Cotton Loom, with single cylinder, 20 harness dobby.  
 One Crompton Jean Loom.  
 One Crompton Lappet Loom, with 16 harness dobby.  
 One Crompton Towel Loom, 2 x 1 boxes.  
 One Lewiston Machine Co. Loom, 4 harness, side cam.  
 One Lewiston Machine Co., Bag Loom.  
 One Kilburn & Lincoln Plain Loom.  
 Eight Lowell Machine Shop Plain Looms.  
 One English Loom, Hattersley.

BULLETIN  
OF THE  
Lowell Textile School  
LOWELL, MASS.

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Special Bulletin of the Textile Design  
Department

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*Issued Quarterly*

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Entered August 26, 1902, at Lowell, Mass., as second class matter,  
under Act of Congress of July 16, 1864.

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*Moody Street and Colonial Avenue*

OFFICERS OF THE  
LOWELL TEXTILE SCHOOL

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A. G. CUMNOCK, *President*

JAMES T. SMITH, *Clerk*

JACOB ROGERS, *Vice-President*

A. G. POLLARD, *Treasurer*

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DEPARTMENT COMMITTEES

*Textile Design and Power Weaving*

FREDERIC S. CLARK, *Chairman*

WALTER E. PARKER

ROYAL P. WHITE

*Finishing*

FREDERIC S. CLARK, *Chairman*

ROYAL P. WHITE

*Decorative Art*

JAMES T. SMITH, *Chairman*

FREDERICK LAWTON

*Administration*

CHARLES H. EAMES, S. B.  
Principal of the School

For Bulletin and Terms address Charles H. Eames, Principal

## OFFICERS OF INSTRUCTION

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### Textile Design and Power Weaving Department

FENWICK UMPLEBY

Professor of Textile Design and Fabric Structure  
in charge of Department of Textile Design and Power Weaving

ARTHUR F. FERGUSON

Instructor in Fabric Analysis and Textile Costs

STEWART MACKAY

Instructor in Hand Loom Weaving

JOSEPH WILMOT

Instructor in Power Weaving and Warp Preparation

JOHN R. WALMSLEY

Instructor in Cotton Power Weaving

ALBERT E. MUSARD

Instructor in Jacquard Power Weaving

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### Finishing Department

ARTHUR A. STEWART

Head Instructor in Finishing

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### Decorative Art Department

EUGENE W. CLARK, JR.

Instructor in Freehand Drawing and Decorative Art



General View of School. Merrimack River and Canal



# COURSE OF TEXTILE DESIGN

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## INTRODUCTION

**Object of textile schools.** . During the latter part of the nineteenth century, textile schools were established in England and Continental Europe. The object of these was to overcome two conditions then existing which promised to become serious unless immediate steps were taken to prevent their continuance.

These conditions were:

- 1 Lack of theoretical knowledge, by operatives, of the machines and processes on which they were employed.
- 2 The prevailing tendency of men in the higher positions to conduct their departments in the regular routine established for years. This prevented a broadening of ideas and gradually developed into a dull monotony noticeable in the market by the lack of life in, and sameness of, mill productions.

Textile schools were established in a few of the largest manufacturing centers in the endeavor to create new life in mill men of all classes.

**Value of earliest textile schools.** The value of these textile schools was soon apparent for nearly every important textile town or city was obliged to open schools giving theoretical instruction as well as practical work in the departments demanded by the operatives. This resulted in scattered schools for cotton spinning, woolen and worsted spinning, design, power weaving and finishing that were satisfactory until their limits had been reached.

**Centralization.** The next step was the centralization of these separate branches which gave the present form of textile school embracing all departments of mill work.

**Establishment of schools in America.** The success of European schools was such that sufficient interest was created among American manufacturers to establish textile schools in this country. The instruction given in the earlier American schools was based upon the principles

of the European school with the modifications necessary for American methods of manufacture. Each succeeding year resulted in increased attendance, both in the day and evening classes, showing that the textile school is appreciated by the American mill employer and employee. The appreciation of the labor expended by the latter in his betterment is best shown by his diligence in study and regularity in attendance.

**Standard of the American school.** From this beginning, the American school has broadened. By the addition of the several branches of mathematics, electrical, steam and mechanical engineering, physics, art and languages an advance has been made in standing from the original idea of a trade school to one which should be placed in the class of technical schools.

There is no comparison possible between the designer of today and the designer of the time before the establishment of textile schools. The old time designer was obliged to rely either upon the work of his predecessors or his own responsibility and observance of the work under him. While lacking the advantages of the present textile school he was successful as far as his work was concerned. His training was a long apprenticeship, possibly more thorough than the training of today. This was due to the fact that the apprenticeship required seven, or more years, while the textile course of today covers three years. To equal the results and make comparisons the textile graduate should be content to spend four years in practical mill work. If this is done and a comparison made the value of a technical training given in a textile school at once shows its worth, for the present designer is not only familiar with the design, construction and analysis of fabrics, but with at least a fundamental knowledge of the working of every branch of mill work from the office to the purchasing of the raw stock. This was possible for the early designer in only rare cases.

**Growth of Lowell Textile School.** Within the past ten years, the Lowell Textile School has grown steadily in equipment, attendance and standing. The main idea of the Trustees has been to eliminate the defects of the earlier European schools and to add new departments to meet the demand as it may arise.

**Courses of Instruction.** The courses of instruction are thorough, combining theory and practice, and make it possible for a student to obtain a complete knowledge of any department of the mill.

**Engineering.** The work in the Engineering Department is devoted to classes in Mechanism which lays the foundation in the elements of machines and finds application later in the Yarn and Weaving departments. This subject is supplemented by courses in Algebra and Plain Trigonometry and their application in textile and engineering problems are shown. A course of Physics in the second year provides in addition

to a general training in the subject a familiarity with its applications in textiles and their manufacture. The special branch of this subject, Electricity, is taken up to considerable extent with reference to its applied side in the modern mill, shop and manufactory.

Mechanical Drawing forms an important part of the first year student's work and is continued in the second year by machine drawing and design of parts of machines. For this a preparation in mechanism and first year mechanical drawing is necessary. The work of the department culminates in the third year in Mill Engineering which considers questions of mill design, construction, power generation and transmission, distribution of machines and means of driving same, also fire protection, heating, ventilation and humidification.

**Chemistry and Dyeing.** The instruction in Chemistry and Dyeing commences in the first year by lectures and laboratory work in General Inorganic Chemistry followed by Organic Chemistry and Textile Chemistry and Dyeing. The latter subject takes up the technology of the vegetable, animal and artificial fibers. The uses and application of dyestuffs and mordants. During the second year the lectures on Dyeing are supplemented by laboratory work.

**Fiber Preparation and Yarn Spinning.** The spinning classes are given instruction on all machines required for spinning either cotton, woolen or worsted yarns. The lectures upon the machines, giving the theoretical part of each machine, and practical work in carding, spinning, twisting and similar processes required in the manufacture of yarn give the student an opportunity of studying the processes through which the fibres pass before weaving.

**Languages.** Elementary and Advanced German are given during the first year and are intended to train the student sufficiently to permit him to translate scientific German.

Practice in English composition during the first year is supplemented by lectures both aiming to give the student freedom in expression and to aid in accuracy and clearness of thought. This is continued in the second year in the subject of Industrial History.

The above subjects represent the work taken by the student in the various departments for the purpose of giving him a general knowledge of manufacture.

The subsequent pages describe in detail the instruction given pertaining to the design, weaving and finishing of a fabric.



Advanced Textile Design Class Room

## Department of Designing

The Textile Design Course prepares a student to become an efficient designer. It also affords him an opportunity for a general study of other branches of mill work thus avoiding the limited knowledge of a specialized subject.

The perfection of a fabric depends mainly upon the specifications given by the designer and the carrying out of his ideas in the Power Weaving Room and Finishing Department. The designer is primarily held responsible for any defects in finished fabrics and for that reason should have a knowledge of the several departments of the mill. If the fault is not his he should be able to trace the defect to its proper source whether raw stock, carding, spinning, weaving designing or finishing. It is this general knowledge of processes that makes a designer valuable to the management of a mill or corporation. For this reason especial attention is given to every detail for the production of a perfect piece of cloth by the student pursuing the Textile Design Course.

A defective design, poor arrangement of coloring, texture too light or too heavy, the use of yarns not adapted to the fabric either in counts, twist, finishing or dyeing qualities, poor preparation of the warp or lack of care in weaving or finishing will produce a fabric fit only for "seconds." These defects are fully studied in the Textile Design subjects and the student not only has the theoretical reasons clearly demonstrated, but the practical reasons as well from work in design, power weave and finishing rooms.

The object of the Textile Design Course is to give:

1. A textile education fitting a student for the higher positions of mill life, and an opportunity for those in textile pursuits to improve their condition.
2. A study of mill conditions in all branches; defects and the methods of overcoming them; the control of production and waste in all departments; costs of production of a mill, room or machine; relation of mill and commission house.
3. A training in the principles of designing and analyzing fabrics and the methods of reproducing them for the interests of mill and customer.
4. The stimulation of personal investigation as promoted by the work of third year.



## SYNOPSIS OF TEXTILE DESIGN COURSE

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The Textile Design course is planned to meet the demand of young men for a practical training in the general processes of textile manufacturing, but with particular reference to the design, construction, analysis, cost, weaving and finishing of a fabric. The foundation is laid in the first year by instruction in mechanics, mechanical drawing, mathematics, chemistry, cotton spinning and the principles of design, analysis and weaving. During the second year textile chemistry and dyeing, woolen spinning, machine drawing, electrical engineering, physics, mechanical engineering, steam engineering, weaving mechanism and industrial history are taken and the third year work in mill engineering, electrical engineering and physical laboratory completes the work of the student in other departments of the school.

Lectures in the Textile Design course during the first year include textile design and fabric analysis dealing principally with single cloths, color effects, drafting and reduction. The second year work is the designing and analysis of standard cloths, single, backed and multiple ply, elements of costs and the application of color to textiles. This leads into the advanced work of the third year—design and analysis of Jacquards, lenos, lappets and fancy cloths and textile costs.

Practical work is given in hand loom weaving during the first and third years.

Power weaving, including warp preparation, commences with the second year and continues during the course.

Decorative Art, an essential in Textile Design, forms a part of the course during the three years.

Lectures and practical work in finishing are taken up in the third year and include all processes required for finishing a fabric.

For description of Textile Design subjects see pages 11, 15-18.



## Textile Design Course

### FIRST YEAR

#### FIRST TERM

	Hours of Exercise		Hours of Exercise
Hand Loom Weaving and Elements of Design	45	General Chemistry	187
Mathematics,—Algebra and Trigonometry	30	Freehand Drawing } Decorative Art }	15
Elements of Mechanism	45	English	15
Mechanical Drawing	112	German	20

#### SECOND TERM

Textile Design, Cloth Analysis	128	Mathematics,—Trigonometry	30
Hand Loom Weaving	45	Mechanical Drawing	68
Elements of Mechanism	60	Cotton Yarns	60
General Chemistry, Organic	30	German	23
Textile Chemistry	15	English	15
Decorative Art	15		

### SECOND YEAR

#### FIRST TERM

Textile Design, Cloth Analysis	160	Cotton Yarns	113
Mechanical Engineering	30	Physics, Light and Sound	30
Textile Chemistry and Dyeing	30	Decorative Art	40
Machine Drawing	40	Industrial History	15
Power Loom Weaving	45		

#### SECOND TERM

Textile Design, Cloth Analysis	95	Textile Chemistry and Dyeing	80
Woolen Yarns	60	Physics, Electricity	30
Decorative Art	60	Machine Drawing	35
Steam Engineering	30	Power Loom Weaving	95
Physical Measurements	15	Industrial History	15

### THIRD YEAR

#### FIRST TERM

Textile Design, Cloth Analysis	130	Finishing	75
Worsted Yarns	125	Decorative Art	40
Power Loom Weaving	100	Electrical Engineering	15
Mill Engineering	30		

#### SECOND TERM

Textile Design, Cloth Analysis	130	Mill Engineering	45
Worsted Yarns	90	Finishing	90
Power Loom Weaving	100	Physical Laboratory	15
Decorative Art	40		



Classroom for D. L. H. Class Room

### **Qualifications for Entrance**

Candidates for admission are accepted upon presentation of properly vouched certificate showing the completion of a regular four year High School course or equivalent. For all others, there are held examinations in June and September. Examinations cover in general the following subjects: arithmetic, English, geography, algebra, plane geometry and American History.

For details of the several subjects see general catalogue.

### **Tuition Fees**

The fee for the day course is \$100 per year for residents of Massachusetts. The fee for non-residents is \$150 per year.

For all students from foreign countries the fee is \$300 per year.

Students must provide their own books, stationery, tools, etc., and pay for any breakage or damage that they cause.

The tuition fee includes free admission to any of the evening classes in which there is accommodation, should any day student desire to attend.

### **Thesis**

All candidates for the diploma of the school must file with the Principal not later than May 15, a report of original investigation, or research; such thesis to have been previously approved by the head of the department in which it is made.

### **Library**

The school library is supplied with leading textile books and with works dealing with science, art or industries allied to the textile trades. The leading textile papers are kept on file.

### **Sessions**

The regular school sessions are in general from 8.30 a. m. to 12.30 p. m., and from 2 to 4.30 p. m., except Saturdays, when the buildings are closed in the afternoon.

A tabular view designates the hours at which the various classes meet. This is rigidly adhered to and the student is marked for his attendance and work as therewith scheduled.



Hand Loom Weaving Department

# OUTLINE OF INSTRUCTION

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## TEXTILE DESIGN COURSE

### FIRST YEAR

#### *Textile Design*

Classification of fabrics; names applied to different parts of cloth with explanations; terms applied to weaves.

Point, or design paper.

Plain fabrics; fabrics on a plain basis.

Intersections; interlacings, cut sections.

Twills and derivatives; twills and diagonals; herring bones; cut diamonds; block effects; corkscrews or double twills; degree twills.

Sateen weaves.

Basket weaves; plain; fancy.

Rib weaves; plain, irregular; oblique.

Checks and stripes.

Fancy weaves; twills; circular weaves; combined twills.

Figured effects; figures on plain ground; figures on twill and fancy ground.

Color effects; hair lines; stripes; fancy figured effects; combinations of colored threads.

Drafting and reduction; chain and draw from design; designing from chain and draw.

Extending and extracting weaves.

Practical work is given in all of the above subjects.

#### *Fabric Analysis*

Reeds and setts; various systems of numbering reeds; regular reeding; irregular reeding.

Relative counts of yarns; weights and measures used in textile calculations; standard numbers.

Woolen yarns; cut; run; skein; grain.

Worsted yarns.

Cotton yarns.

Silk yarns; spun, dram; denier.

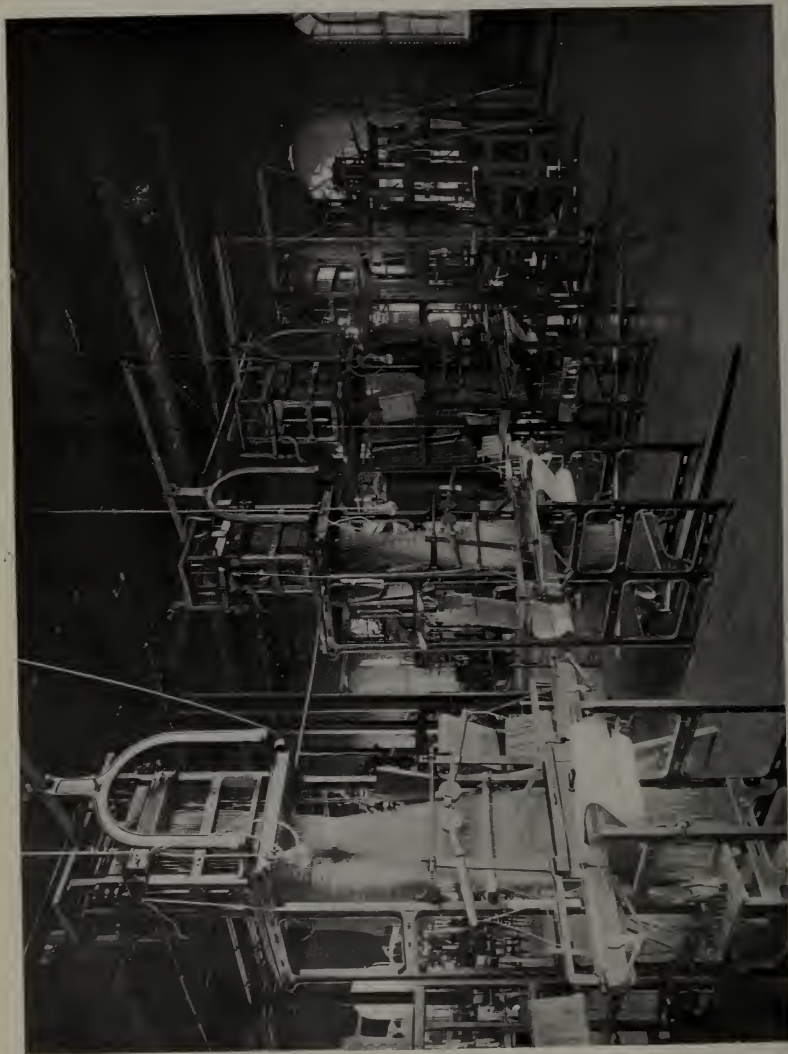
Yarns made from vegetable fibres; linen; jute; ramie, etc.

Grading of yarns.

Equivalent counts; constants.

Folded, ply or twist yarns; equal counts; unequal counts; yarns of different fibres.





Hand Loom Jacquard Weaving



Novelty and fancy yarns.

Metric system; weights and measures; yarn system; counts; English equivalents; metric equivalents of English; comparison of metric and English systems.

Calculations in all of the above. In addition calculations are given for finding weights of varying lengths of fabrics, warp, filling and fabric in both English and metric systems; counts, lengths and weights.

Analysis of fabrics; dissection of a fabric to obtain weave, pattern and weaving; stamping out of various samples (one square inch and four square inches); counting and weighing of warp and filling yarn in samples; calculations for all requirements, finished and loom, from data obtained from samples.

Take-up; explanation; effect on counts, width and length, loom and finished.

### *Hand Looms*

Parts of loom head motion; lay; harnesses; cloth roll; whip roll; breast beam; warp beam.

Parts of head motion; lift; cam; griffe; slide; cylinder; needles; needle springs; hooks; pawl; spring hammer; grate.

Parts of lay; box levers; shuttle boxes; picker; picker spindles; picker stick; picker springs; swords; reed cap; reed space; race; box release.

Sketches; students are required to make sketches of the above parts.

Practical work; dissection of fabric to be reproduced; selection of yarns; hand dressing; beaming, drawing-in; reeding; weaving. The student uses various combinations of colored yarns, warp and filling, to obtain the most suitable effects.

Calculations; numbering reeds; dressing; combing; harnesses; irregular reeding; weights of warp and filling.

### *Decorative Art and Free Hand Drawing—Given by Decorative Art Department*

Sketching from objects. Practice in lettering. Theory of color, color mixtures, and color harmony. Elementary principles of designing are taken up during the first year.

For the second and third years attention is given to advanced problems in design having application in textiles. Work in the studio is supplemented by lectures on the History of Art and Textile Fabrics, Color Planning for Ornament and Lettering. The following historic periods are studied: Egyptian, Greek, Roman, Saracenic, Byzantine, Romanesque, Gothic, Renaissance and Modern. Original work is

stimulated and encouraged and opportunity is given for students to work out their designs upon the loom. Problems are given in the design of laces, rugs and stuff for furniture to correspond with the historic periods to which each belongs.

## SECOND YEAR

### *Textile Design*

Twilling; fancy twills; reverse twills.  
Diaper work; point draw; double and triple draws; alternate effect.  
Damask; stripe; check; fancy basket basis; given number of changes.  
Original designs from given draw.  
Analysis of color effects.  
Skip weaves; sateen basis; twills; fancy weaves.  
Sateen fabrics with plain ground; stripes; checks.  
Backed fabrics; filling backed; 1 and 1; 2 and 1; construction; binding; twills; fancy weaves; cut weaves; worsted fabrics; woolen fabrics; union fabrics; warp backed; construction; comparison with filling backed; stripe effects on back; counts of yarns; drafting and reduction of backed fabrics; analysis of weaves.  
Multiple ply fabrics; double cloths; construction; binding; relations of face and back fabrics; drafting and reduction of double cloth design; diagrams; cut sections; analysis of weaves; three ply or triple fabrics; construction; face fabric; middle fabric; back fabric; binding; drafting and reduction of design; diagrams; cut sections; analysis of weaves; binding warps.  
Practical work in the above fabrics.

### *Fabric Analysis*

Average counts; warp pattern; filling pattern; fabric; various methods.  
Unknown count in twist thread; two ply; three or more ply; union twist.  
Weight of material to produce a given weight.  
Weights of yarns required to be twisted to work lots of yarn; two ply; three ply; novelty and fancy yarns.  
Diameters of yarns; construction of various yarns; effect of twist on diameters.  
Balance of cloth; proportions of warp and filling; texture of plain, twill, sateen, rib and basket weaves compared; changer in texture when changing from one weave to another, based upon diameter of yarns.  
Shrinkage; percentages, weaving, finishing, total warp, filling; dead

loss in scouring fabric; percentages from lengths and widths; weights per yard from given lengths; weights per yard from given percentages; weights per yard from counts or runs of yarn and textures; comparison of weights per yard and runs of yarn scoured and greasy; calculations for finding loom requirements; variations in texture effected by percentages; finding loom requirements for required weight per yard finished.

Yarn testing; necessity; testing for counts; cotton, linen, worsted and woolen yarns; the use of balances, English and metric; testing by comparison; constants; strength, elasticity, evenness and quality tests.

Calculations; yarn weights and counts; reeding; harness, simple and fancy draw; lengths and weights for all fabrics given under Textile Design.

### *Color Applied to Textiles*

Theory of color; pigment; light.

Classification of colors; primary; secondary; tertiary.

Color trees.

Spectral colors.

Tones; tints; shades.

Hues and broken colors.

Value.

Scaling.

Neutral colors.

Color harmony; theory; combinations of colors to produce.

Relations of colors to textiles; raw material; twist and novelty yarns; extra warp or filling.

Qualifications of a colorist.

Necessity of pure colors in textiles.

Red; its characteristics; use in twist yarns; application to woolens and worsteds; red derivatives.

Blue; its derivatives and characteristics; application in twist yarns and fabrics.

Yellow, green, orange, purple; their derivatives; uses in textile fabrics.

Mixes; elements; purity and equality of material; comparison of mixes.

Blends; testing combinations of colors; comparison of a wool blend and the same colors used in pigments.

Mixes with; white; black; fancy colors and white or black.

Grey mixes.

Weaving mixes.

Color effects; single cloths; backed fabrics; double cloths; extra warp; extra filling; extra warp and extra filling.

Single cloth color effects; plain weave stripes; twill stripes; hair lines; shaded stripes; checks; tartans; all over effects; figured effects;



flannels; trouserings; dress goods; cotton fabrics; combinations of stripes and bars; adaptations of Scotch plaids; checks of three or more colors; shaded effects; broken checks; spotted corkscrews. Extra warp or filling; spot effects; stripe effects; all over effects. Double cloth; French figuring; vestings, etc.

### *Warp Preparation*

Woolen and worsted pattern warping.  
Spooling with calculations.  
Twisting-in; dressing; beaming.  
Cotton pattern warping.  
Back beams from warping frames.  
Size box; drying; beaming.  
Drawing-in; calculations for harnesses; reeding.

### *Power Weaving*

#### PLAIN LOOMS

Shedding.  
Comparison of cams.  
Treadles; pin; bowl.  
Harnesses; bottom straps; top straps; roll and set collars; lambs; jacks; front harness; back harness.

#### COTTON, WOOLEN AND WORSTED LOOMS

Picking; cone pick; pick cam; pick shaft; pick cone; picking arm; dog; picking stand; picking shoe; picking stick; heel strap; lug straps; sweep; stirrup strap.  
Bat wing pick; picking shoe; pick ball; picking arm; sweep, or power stick; lug strap; stirrup strap; picking stick; heel strap and spring; picking stick stud.  
Binders; blunt; tapered; setting.  
Stop motions; side; center; electric; automatic.  
Let off motions; friction; gear.  
Tape-up motions; positive; negative.  
Timing and setting of; pick motion; boxes; multipliers on box chain.

### *Weaving Mechanism*

#### MOVEMENT OF THE WARP

Let off motions, tension motions, temples, leases, take-up motions.  
General arrangement of warp and harnesses.  
Let off motions; (a) Friction let off; hand regulated; automatic.  
(b) Geared let off; positive; negative.



Take-up motions; positive; negative; compensating; cut and measuring motions.

Harness motions.

Cam motions; negative, (a) inside cams with top rolls, (b) outside cams; positive (a) outside cams with vertical levers, (b) other positive motions.

Design of shedding cams; diagrams; layouts for 2, 3, 4, 5 and 6 harnesses; other forms of cams.

Selvage Motions.

Head motions; Crompton head; Knowles head; other forms of head lappet and needle motions.

Jacquard head motions; single lift machines; double lift machines; single cylinder; double cylinder; combinations of above.

#### MOVEMENT OF THE FILLING

Lay motions; graphical study of common type of lay motion; double beat up motion; variable throw and oscillating reed motions; cam and other lay motions.

Shuttle, or pick motions; the shuttle; cone or ball pick motions; bat wing pick motion; canvas drive motion; design of picking cams; calculations on pick motions; positive and other forms of pick motion.

Box motions; Crompton box motion; Knowles box motion; other forms of motion; multipliers.

Filling and shuttle changing motions; Northrop filling changing mechanism; other filling changing mechanisms.

#### PROTECTIVE AND STOP MOTIONS

Dagger and brake protector.

Shuttle guard.

Reed protector.

Picker and box motion protectors.

Filling stop motions.

Warp stop motions; electrical; mechanical.

#### THIRD YEAR

##### *Textile Design*

Double plain; construction; hair line stripes; checks; cut sections; diagrams; spot weaves.

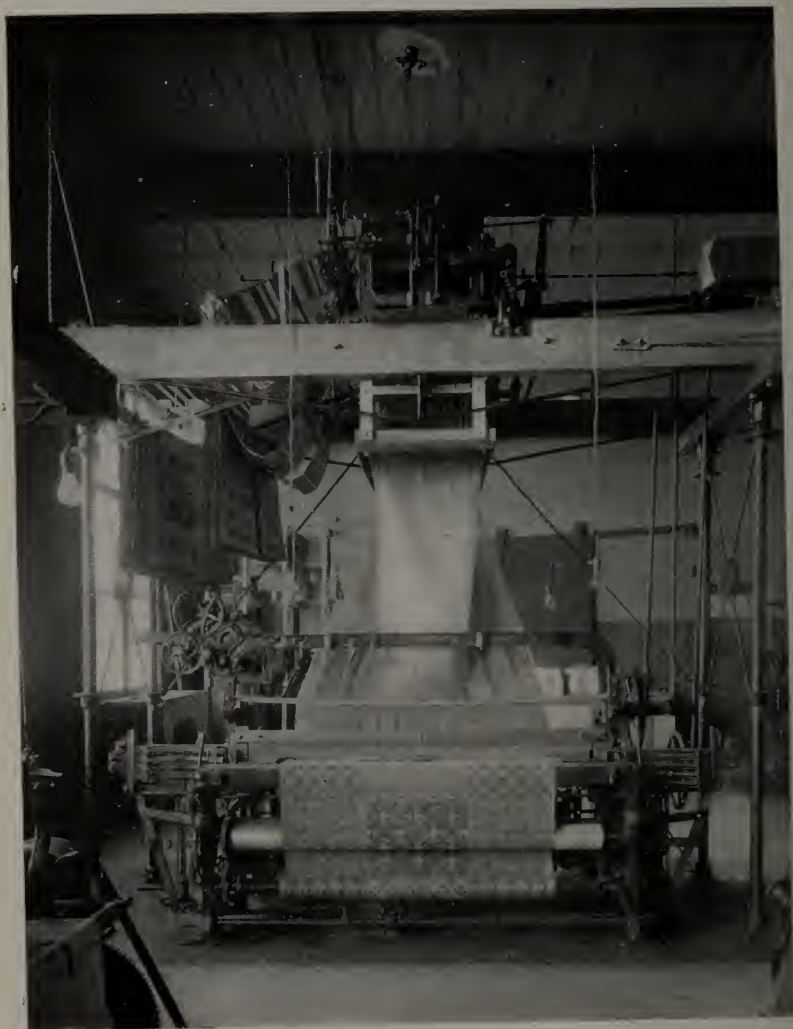
Ingrains; construction; various methods of designing Ingrains; card cutting instructions; keys; cut sections.

\* Tricots; tricot; tricot long; foundation of weave; yarns and dyeing; various methods used in construction of tricots.

Chinchilla; varieties of fabric; pile filling; ground filling; back filling; stuffing filling; warps; construction of design; bindings; cut sections.



Tapestry; construction of design; effect of coloring upon weave; card cutting instructions; cut sections; making design from motive.  
 Blankets; cotton fabrics; cotton warp, woolen filling; weaves; construction of various classes of fabrics; card cutters instructions for making design from desired effect; carriage robes; bath robes, etc.  
 Upholsteries, hangings, etc.; principles of construction; number of warps and fillings; binder warp; yarns; texture; reversible effects; card cutter's instructions.  
 Spot weaves; single cloth; warp effects; filling effects; warp and filling effects; backed fabrics; extra warp; extra filling; extra warp and filling; multiple ply fabrics; French figuring; three ply.  
 Pile or plush; filling plush; construction; binding; ground filling; pile filling; diagramss; cut sections; corduroy; comparison with filling plush; binding; warp plush; construction; cutting of pile; terry cloth; principles of weaving warp plush; Turkish towels; Wilton carpet.  
 Crepon; varieties of fabrics produced by means of crepon weaves; characteristics of crepons; back warp; face warp; methods of producing crepon effects; yarns; twist; novelty effects; crimped effects; cotton crepons.  
 Imitation Matelasse; construction; comparison with crepons; finish.  
 Matelasse; characteristics; construction; warps; fillings; face figure; ground; binding; cut sections.  
 Pique; origin; characteristics; construction; stuffing filling; binding; yarns; fleece-lined fabrics; printed piques; classes of fabrics produced.  
 Marseilles Quilting; construction; binding; comparison with Pique; various methods of obtaining figured effect; use of stuffing pick; cut sections.  
 Jacquard; explanation of head; card cutting; repeat of design; various sizes of design paper; casting out; arrangement of hooks in a machine; effect of hooks on design; distribution of figures; ground weaves; areas; arrangement of figures; sateen orders; broken orders; figures formed by both warp and filling; figures not square; diagrams; stripes; diagonals; changing stripes into diagonals; calculations.  
 Leno; plain gauze; ground threads; crossing threads; standard; doup; explanation of working of crossing and ground threads; full gauze; twill effects; diamond effects; warp figures; filling figures; open textures; stripe effects; bar effects; leno and sateen effects; chain and draw; diagrams; diagrams from chain and draw; chain and draw from diagrams; crossing more than one thread.  
 Fustian; varieties; imperials; diagonal; swandowns; simple weaves; backed cloth principles; mole-skins; beaverteens; fustian cutting; velveteens; reversible sateens; plain backs; cut sections to show cutting; ribbed velveteens; figured velveteens.



Jacquard Tapestry Power Weaving

Tissue fabrics; construction; Madras muslin; ground; figuring filling; working of Jacquard machine; design paper; leno figures; colored effects; standard and doup.

Lappets; whip warp; characteristics of fabric; action of needles; figured effects; stripes; all-over designs; printing; cross thread figuring; spot effects.

### *Fabric Analysis*

Loom production; stops; running time; picks per minute and per inch; figuring production for a loom, a section or a room; pounds production.

Calculations for Meltons, etc.; percentages; loom data; runs and weights of warp and filling, loom, scouring, fulled, finished; textures.

Jacquard calculations; design paper; casting out; areas; repeats, etc.

Calculations for all varieties of fabrics including subjects given during the previous school work.

Finding quantity of raw stock required for any length and weight of fabric; losses in scouring, carding, spinning, warp preparation; weaving; finishing, etc.

Cost of mixes and blends; two, or more grades of raw stock; percentages of each grade; quantity of each grade; finding quantity of an unknown value to mix with two or more grades of known value and quantity to produce a given cost.

Analysis and requirements of every fabric given in Textile Design lectures.

### *Textile Costs*

Necessity of a modern cost system.

New and old methods of costs compared.

Organization of a mill; stockholders; directors; committees; administration; labor; material.

Relationship of managers and departments.

Organization elements of a textile cost system.

Division of mill into departments.

Relations of individual authorities in a mill.

Principles of costs in mills.

Necessity of co-operation by heads of departments.

Correspondence; stockholders; expense; commercial; payment for materials; receipts for manufactured products.

Manufacturing division; supplies; manufactures; stores.

Commercial division; advertising; costs; sales.

Department division.

Control and duties; stockholders; directors; committees; agent, etc.

Distribution of expense; administrative; assistant labor; actual labor; commercial.



Jacquard Power Weaving

Expenditures; general; labor; material and supplies; manufacturing; commercial.  
 Separation of manufacturing and commercial expense.  
 Charging of expenses.  
 Division of costs; labor, assistant and actual; material, in process, office, supplies; general, taxes, interest, insurance, etc.  
 Depreciation.  
 Day labor; advantages and disadvantages; limitation of production.  
 Piece work labor.  
 Premium labor.  
 Differential labor.  
 Cost of labor; advances; reduction.  
 Machinery; life, depreciation; chargeable expense.  
 Depreciation tables.  
 Actual cost tables.  
 Systemizing the cost of a mill.  
 Details of fabrics.  
 Processes required for each fabric.  
 Equipment inventory.  
 Detailed valuation of machinery.  
 Cost of fabric; end of each process; finished.  
 Simplification of cost system by numbering or lettering processes.  
 Perpetual inventory.  
 Flat cost.  
 Material tables.  
 Time cards.  
 Department weekly cards; production; expense.  
 Time sheet applied as pay roll.  
 Operatives; qualifications; application cards; records while employed; instruction.  
 Labor; fluctuations; incentives.  
 Fixed assets.  
 Uses of cards for various purposes.  
 Comparative figures in costs.  
 Chart systems.  
 Comparative labor charts.  
 Production and labor charts.  
 Reduction of costs.  
 Fines systems.  
 Labor efficiency.  
 Waste; supplies; material; power.  
 Leaks; tests; labor material; supplies; office.  
 Comparison of departments; production; costs.  
 Sample cotton cost; particulars of finished fabric, pounds production, yards per pound finished and cloth room, yards production, net gain





Finishing Department



or loss (dyeing or bleaching) cloth room to finished, cost per pound of raw cotton figured from office records, manufacturing expenses, general expenses, sample weekly cards of each department, time cards, yarn table raw stock to dressing or weaving, cost per pound of stock at end of each process, cost per pound of fabric before weaving, weaving cost, dyeing cost, design room cost, finishing cost, assistant manufacturing cost, assembly of costs for each fabric per pound and per yard, proof of costs from office records, selling cost allowance, final cost per pound or per yard.

Specimen costs are given for cotton, woolen, worsted and silk fabrics.

### *Power Weaving*

#### WOOLEN AND WORSTED LOOMS

Head motion; timing; general construction; reverse motion and timing.  
Box motion; multiplier; timing; fitting new set of boxes.  
Binders; fitting, etc.  
Building of box chain; with multiplier; without multiplier.  
Filling stop motion; explanation; timing, etc.  
Take-up motion; timing; calculations.  
Causes of; mispicks; shuttles flying, etc.  
Harness; setting.

#### DOBBY

Parts of Head.  
Single lift.  
Double lift.  
Timing of parts and fixing.  
Causes of defects in cloth.

#### JACQUARD

Single action machine.  
Double action machine.  
Double lift and single cylinder machine.  
Rise and fall or close shed machine.  
Tying up of machines.  
Card cutting.  
Hooks, explanation of different kinds.  
Cylinder and its working parts.  
Griffe.  
Griffe levers; explanation; timing.  
Timing and setting of all kinds of machines.



Finishing Department

## Woolen and Worsted Finishing

In charge of the Chief of the Department of Finishing

### *Burling and Mending*

Examination of flannel from loom.  
Perches; construction; location regarding light, etc.  
Marking defects, measuring, weighing and numbering.  
Methods of inspection; fancies; single cloths; double cloths, etc.  
Object of burling and mending.  
Various types of burling tables.  
Usual method of removing; knots; runners, etc.  
Object of back shearing; back burling.  
Burling and specking irons.  
Replacing missing threads, etc.  
Importance of sewing on various fabrics.  
Removal of oil and tar spots, etc.

### *Fulling*

Object.  
Condition of flannel from the loom; oil, size, etc.  
Early methods of producing a felt.  
Construction of various types of stocks; hammer falling, crank stocks, etc.  
Construction and object of the kicking mill.  
Various types of rotary fulling mills; single and double, etc.  
Details of construction of; main rolls; wooden and composition; methods of covering; regulation of pressure, adjustment, etc.  
The trap; methods of regulating trap pressure; shoes, wooden and bronze.  
Stop motion; various types; object; method of regulating.  
Various types of; stretchers; guide rolls; throat plates, etc.  
Theory of; felting; pressure; moisture; heat.  
Felting and hygroscopic properties of various woolen fibres.  
Action of; alkali; acid; heat; moist and dry.  
Drafts; single; double; triple.  
Preparation of flannel for the mill; tacking selvages; sewing ends.  
Various methods of measuring shrinkages.  
Application of soap; soaping machine; direct application in the mill; tests for moisture; over and under soaping.  
Preparation of soaps for fulling and scouring purposes; body and strength, etc.  
Value of various soaps for fulling; tallow; palm oil; red oil, etc.  
Tests for impurities.  
Determination of proper strength for fulling and scouring various goods; alkalies.  
Action of soap in the fulling mill; saponification process; lubrication of fibres, etc.

Regulation of warp and filling shrinkages.

Cover required for various finishes.

Theory of handling various classes of goods in the mill; all wool; shoddies; mixed goods.

#### *Estimation of finishing shrinkages*

Loss of flocks during various operations; fulling; gigging; shearing, etc.

Flocking; various methods; dry; wet; combination.

Preparation of the flocks; sorting; grinding, etc.

Mill wrinkles; spots; rolling selvages; cockles; cloudy and tender goods, etc.

#### *Washing and Speck Dyeing*

Object.

Rinsing.

Scouring.

Construction of various types of washers; rotary; continuous; open width; hosiery washers.

Details of construction; main rolls; suds-box; guides, etc.

Theory of scouring.

Scouring various classes of goods before and after fulling.

The use of; Fuller's earth; salt solutions; sours, etc.

Defects caused by improper scouring; stains; cloudy effects; wrinkles; unclean goods, etc.

Object of speck dyeing.

Methods of preparation; materials used; testing.

Various methods of application.

#### *Carbonizing Flannel*

Object.

Carbonizing agents.

Hydrometers.

Strengths of solutions.

Drying and dry milling.

Neutralizing; various methods.

Stains developed during carbonizing.

Hydro-extractors; various types; details of construction.

Construction of various types of drying and tentering machinery.

#### *Gigging, Napping and Steaming*

Object.

Method of treating various classes and grades of flannels.

Construction of various types of gigs, nappers, steamers.

Construction and object of rolling and stretching machines.

Teasels, growth; setting, etc.

Cropping.  
Straightening.  
Wet gigging, etc.  
Various methods of steam finishing.  
Lustre, etc.  
Crabbing; object.  
Construction of crabs.  
Methods in general use.  
Cooling, etc.  
Singeing; gas; plate.  
Construction of various types.  
Methods of water-proofing.  
Apparatus in general use.

*Brushing, Shearing, Pressing, etc.*

Steam brushing; object.  
Various types of machines.  
Steaming; moisture; lustre, etc.  
Shearing; object.  
Various types and details of construction.  
Grinding.  
Setting of shears, etc.  
Various types of plate and rotary presses.  
Details of construction.  
Pressure.  
Steaming, etc.  
Discussion of various machines for special purposes; construction; object, etc.  
Methods of finishing all classes and grades of woolen and worsted fabrics.  
Object of sponging.  
Various methods.  
Destruction of lustre.  
Spotted and shrinking.  
London shrunk; cold water process; hydraulic pressing.  
Cloth examining; measuring; weighing; ticketing; numbering; rolling, etc.  
Allowance for defects, etc.  
Necessary calculations are given in connection with the above.



Finished Fabric



## EQUIPMENT

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### Power Weaving

#### *Cotton Warp Preparation*

- One Spooler, Lowell Machine Shop, Lowell, Mass.
- One Warper, Lowell Machine Shop, Lowell, Mass.
- One Slasher, Lowell Machine Shop, Lowell, Mass.
- One Beamer, T. C. Entwistle Co., Lowell, Mass.
- One Winder, Altemus & Co., Philadelphia, Pa.
- One 400 End Improved Draper Warper, Draper Co., Hopedale, Mass.
- Drawing-in Frames, etc.
- One Pat. Slasher Press Roll, J. Battles & Co., Lawrence, Mass.
- One Pat. Expansion Comb for Warper, T. C. Entwistle Co., Lowell, Mass.
- One Quiller, Johnson & Bassett, Worcester, Mass.
- One Wet and Dry Twister, Draper Co., Hopedale, Mass.
- Set of six in. spools for Warper, Macrodi Fiber Co., Woonsocket, R. I.

#### *Woolen and Worsted Warp Preparation*

- One 40 End Jack Spool, Davis & Furber Machine Co., North Andover, Mass.
- One Dresser for Woolen and Worsted Section Warps, Davis & Furber Machine Co., North Andover, Mass.
- One Reel, Davis & Furber Machine Co., North Andover, Mass.
- One Beamer, Davis & Furber Machine Co., North Andover, Mass.
- One 48 Spool Creel, Davis & Furber Machine Co., North Andover, Mass.
- Hand Warping and Beaming Frames.

#### *Silk Preparing Machinery*

- One Winder, Atwood Machine Co., Stonington, Conn.
- One Ribbon Quiller, Atwood Machine Co., Stonington, Conn.
- One Warper and Beamer, Swiss Style, Atwood Machine Co., Stonington, Conn.
- One Double Frame, Atwood Machine Co., Stonington, Conn.

### *Braiding Machinery*

- One 24 Line Hercules Braider, New England Butt Co., Providence, R. I.
- One 12 Line Braider, New England Butt Co., Providence, R. I.
- One Tubular Braider, New England Butt Co., Providence, R. I.
- One Sautach Braider, New England Butt Co., Providence, R. I.

### *Plain Looms*

- One Plain Northrop Loom, Draper Co., Hopedale, Mass.
- One Plain Print Cloth Loom, Whitin Machine Works, Whitinsville, Mass. To this is attached a Kip-Armstrong Warp Electric Stop Motion.
- One Plain Print Cloth Loom, Mason Machine Works, Taunton, Mass.
- One Kilburn & Lincoln Plain Loom.
- Eight Lowell Machine Shop Plain Looms.
- One English Loom, Hattersley.
- One Improved Northrop Loom, fine sateen, Draper Co., Hopedale, Mass.
- One Northrop Loom with dobby, Draper Co., Hopedale, Mass.
- One Side Cam Twill Loom, Whitin Machine Works, Whitinsville, Mass.
- One Five Harness Sateen Loom, Lowell Machine Shop, Lowell, Mass.
- One Harriman Automatic Shuttle Changing Loom.
- One Lewiston Machine Co. Loom, 4 harness, side cam.
- One Crompton Jean Loom.

### *Fancy Looms*

- One Lewiston Machine Co. Bag Loom.
- One Knowles Gingham Loom, 4 boxes, Crompton-Knowles Loom Works.
- One Crompton Gingham Loom, 4 x 1 boxes, Crompton-Knowles Loom Works.
- One Crompton Towel Loom, 2 x 1 boxes, Crompton-Knowles Loom Works.
- One Crompton Lappet Loom, with 16 harness dobby, Crompton-Knowles Loom Works.
- One Knowles Fancy Cotton Loom, 20 harness dobby, 4 boxes, for fancy leno work, Crompton-Knowles Loom Works.
- One Knowles Fancy Cotton Loom, 25 harness dobby, Crompton-Knowles Loom Works.
- One Crompton Fancy Cotton Loom, single cylinder, 20 harness dobby, Crompton-Knowles Loom Works.
- One Knowles Gem Loom, 20 harness, 4 x 4 boxes, Crompton-Knowles Loom Works.

- One Crompton Worsted Loom, 24 harness, 4 x 4 boxes, Crompton-Knowles Loom Works.
- One Crompton Fancy Loom, 6 x 1 double cylinder, 20 harness dobby, Crompton-Knowles Loom Works.
- One Twenty Harness Dobby Loom, Whitin Machine Works, Whitinsville, Mass.
- One Crompton & Knowles Heavy Loom, 20 harness, 4 x 4 boxes, Crompton-Knowles Loom Works.
- One Knowles Blanket Loom, 25 harness dobby, 4 boxes, Crompton-Knowles Loom Works.
- One Knowles Worsted Loom, 32 harness, 4 x 4 boxes, Crompton-Knowles Loom Works.
- Three Knowles Heavy Woolen Looms, 25 harness, 4 x 4 boxes, Crompton-Knowles Loom Works.
- One Model Dobby Attachment.

### *Jacquard Looms*

- One 400 hook Schaum and Uhlinger Jacquard Machine.
- One Knowles Fancy Loom, single lift Jacquard, Crompton-Knowles Loom Works.
- One Knowles Fancy Loom, double lift Jacquard, Crompton-Knowles Loom Works.
- One Knowles Fancy Loom, Jacquard tied up for leno, Crompton-Knowles Loom Works.
- One Knowles Ingrain Carpet Loom, 4 x 4 boxes, Crompton-Knowles Loom Works.
- One Crompton Ingrain Carpet Loom, 4 x 4 boxes, Crompton-Knowles Loom Works.
- One Stafford Silk Loom, 1200 hook Halton Jacquard, Crompton-Knowles Loom Works.
- One Crompton & Knowles 72 in. Tapestry Loom, 2600 hook Tapestry Jacquard Head, Crompton-Knowles Loom Works.
- One Jacquard Piano Card Cutting Machine, John Royle & Sons, Paterson, N. J.

### **Hand Loom Weaving**

- Twelve Hand Looms, 3 x 3 boxes, 20 harness dobby.
- Eight Hand Looms, 4 x 4 boxes, 24 harness dobby.
- Eight Hand Looms, 3 x 3 boxes, 32 harness dobby.
- Six Hand Looms, 4 x 4 boxes, 30 harness dobby.
- Two Hand Looms, 4 x 4 boxes, 32 harness dobby.
- Two Hand Looms, 4 x 4 boxes, 200 hook Jacquard.

Two Hand Looms, 3 x 3 boxes, 200 hook Jacquard.  
 Two Hand Looms, 3 x 3 boxes, 600 hook Jacquard.  
 One Hand Loom, 48 harness.  
 Two Hand Looms with treadles.  
 One Quiller, Atwood Machine Co., Stonington, Conn.  
 Pattern Warping Stands.  
 Beaming, drawing-in stands, etc.

### Finishing

One 2 string Washer, Rodney Hunt Co., Orange, Mass.  
 One Fulling Mill, Rodney Hunt Co., Orange, Mass.  
 One Up and Down Dry Gig, Curtis & Marble, Worcester, Mass.  
 One Rolling and Stretching Machine, Curtis & Marble, Worcester, Mass.  
 One Up and Down Wet Gig, Curtis & Marble, Worcester, Mass.  
 One Steam Finishing Machine, Curtis & Marble, Worcester, Mass.  
 One Two Cylinder Double Acting Brushing Machine, Curtis & Marble, Worcester, Mass.  
 One Kicking Mill, James Hunter & Co., North Adams, Mass.  
 One 6-4 Double Shear, Parks & Woolson, Springfield, Vt.  
 One 6-4 Voelker Rotary Press, G. W. Voelker & Co., Woonsocket, R. I.  
 One 60 in., 4 Cylinder Sanding and Polishing Machine, Curtis & Marble, Worcester, Mass.  
 One Tentering and Drying Machine, John Heathcote, Providence, R. I.  
 One Single Crabbing Machine, H. W. Butterworth & Son, Philadelphia, Pa.  
 One 72 in., Woolen Napper, Davis & Furber, North Andover, Mass.  
 One 32 in., Basket Hydro-Extractor, W. H. Tolhurst & Son, Troy, N. Y.  
 One Measuring Machine, Fabric Measuring and Packaging Co., N. Y. Parks & Woolson.  
 One Sewing Machine, Birch Brothers, Somerville, Mass.  
 Soap tanks, perch, burling and measuring tables.

In addition to the above equipment, the student in Textile Design must become familiar with instruments and machinery required for practical work in Textile Chemistry and Dyeing, Physical Laboratory, Mechanical and Electrical Engineering, and Cotton and Woolen and Worsted Yarn Manufacturing. Details of the equipment of these Departments may be found in special department bulletin or in the General Catalogue.

The mechanical equipment of the school includes the best makes of machinery, and these machines, while built as they would be for regular

work, are, so far as possible, adapted to the experimental work which is of particular value in such an institution as this.

The floor space of the separate rooms under Textile Design is:

Decorative Art and Textile Design	12,400 sq. ft.
Power Weaving	15,600
Finishing	7,000

These rooms, as well as the rooms of other Departments, are equipped with a thorough system of ventilation, the fresh air being drawn directly from the outside of the building into the class rooms. The lighting system is adequate. Each room is amply supplied with windows which necessitates the use of artificial light only during the shortest days of the winter season.

### Evening Classes

#### *Textile Design*

The evening course in Textile Design is arranged for three years, twenty weeks in each year. The classes are divided into two sections; 1, Textile Design and Fabric Structure; 2, Textile Calculations. The classes meet on the following nights:

#### FIRST YEAR

Monday evening, Textile Design  
Tuesday evening, Textile Calculations

#### SECOND YEAR

Monday evening, Textile Design  
Thursday evening, Textile Calculations

#### THIRD YEAR

Thursday evening, Textile Design  
Friday evening, Textile Design

At the completion of the regular three years' course, a graduate of the regular Textile Design Course may take a Post Graduate Course during which lectures on Textile Costs and Fabric Analysis are given. The lectures are similar to those given the day classes during the second and third years.

## POST GRADUATE

Tuesday evening, Textile Costs  
Friday evening, Fabric Analysis

### *Power Weaving*

The evening classes in Power Weaving are divided into three sections; Woolen and Worsted Weaving, Cotton Weaving, Dobby and Jacquard Weaving. The course of instruction is one year and includes the study of Warp Preparation and Loom Fixing.

Classes meet as follows:

#### FIRST TERM

Monday evening, Woolen and Worsted Weaving, Cotton Weaving

Tuesday evening, Woolen and Worsted Weaving.

Thursday evening, Cotton Weaving, Dobby and Jacquard Weaving.

Friday evening, Dobby and Jacquard Weaving

#### SECOND TERM

The classes meet on the same evenings as the first term to study Warp Preparation and to apply the lectures of the First Term in practical Fixing on the looms.

### *Woolen and Worsted Finishing*

The Woolen and Worsted Finishing Course is one year during which lectures, with practical demonstration, are given in all branches of Woolen and Worsted Finishing. The classes meet on Tuesday and Thursday evenings.

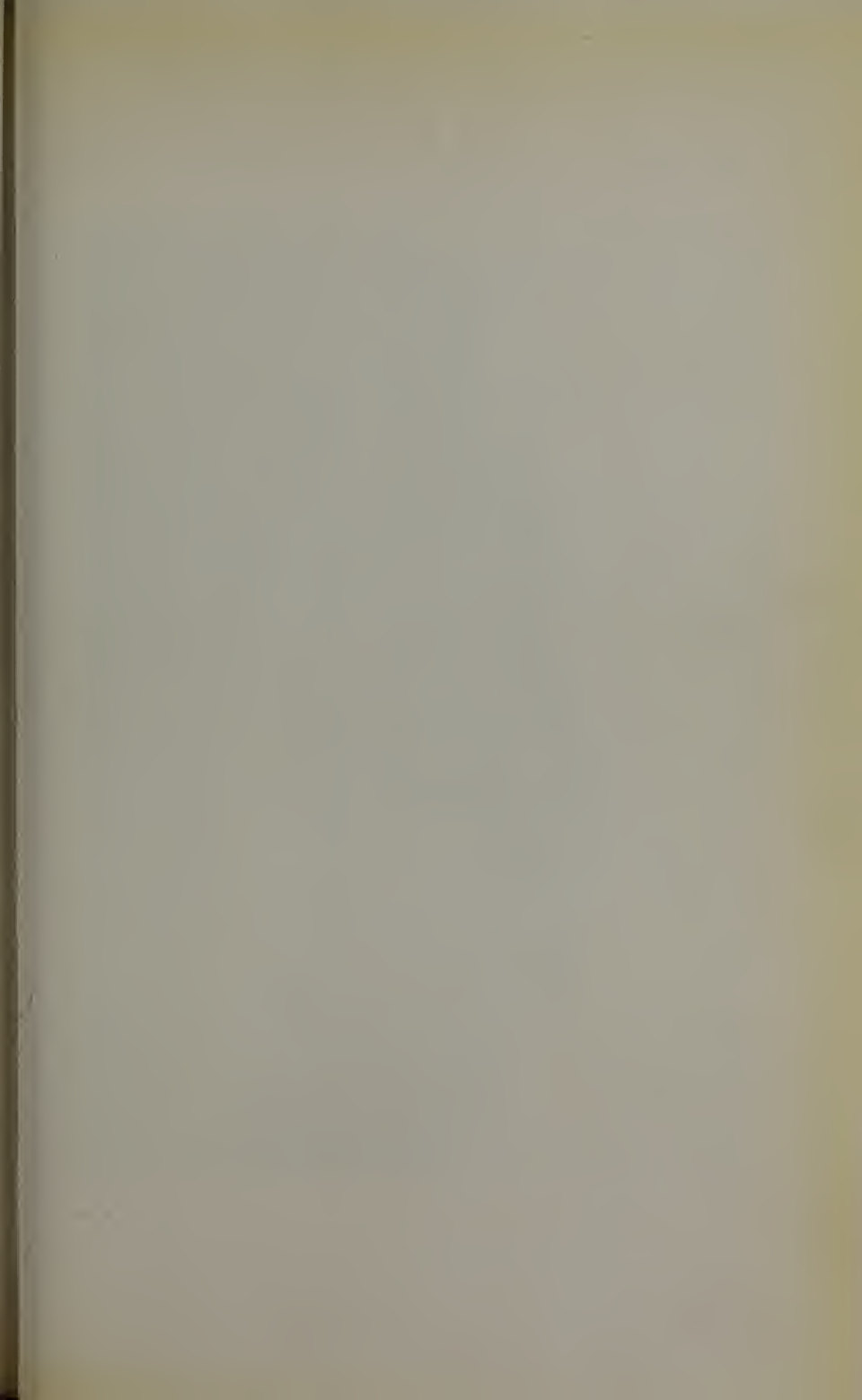
### *Decorative Art*

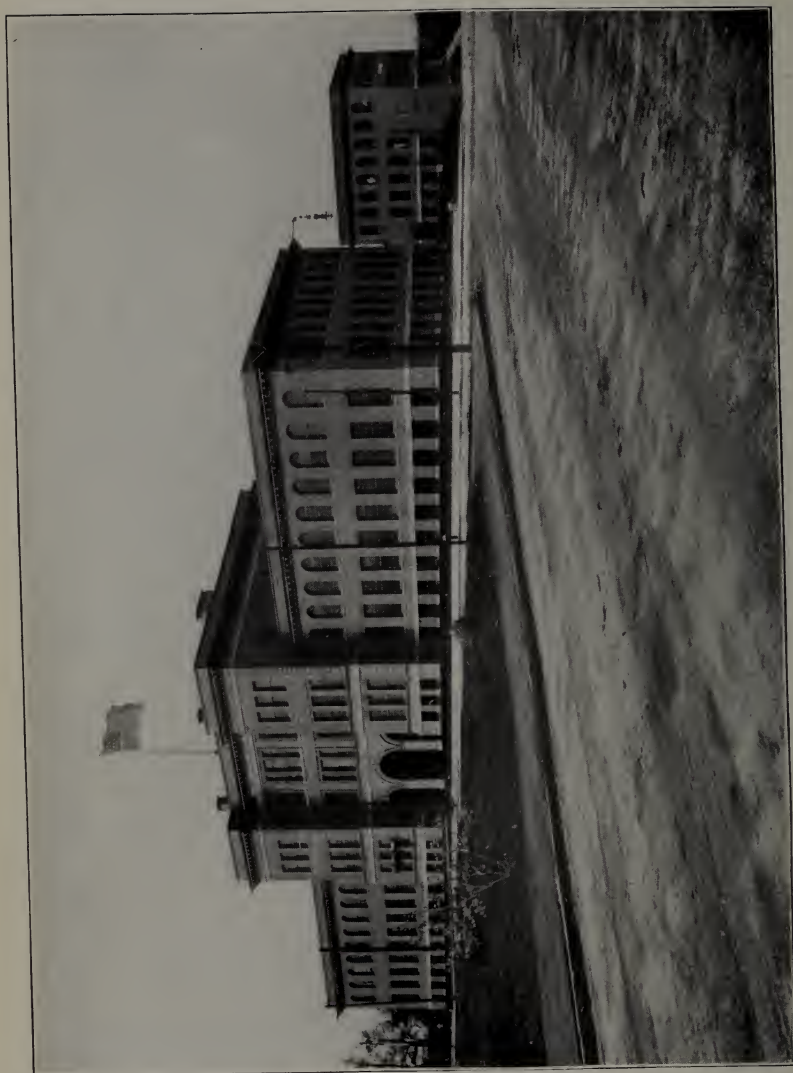
Classes are formed for freehand drawing when a sufficient number of students make application.

All Evening Courses are free to residents of Lowell. The fee for each course for all except residents of Lowell is \$5.00 per year.

For the satisfactory completion of any of the above courses, the certificate of the school will be awarded.







FALMOUTH STREET BUILDING

SOUTHWICK HALL

May, 1908

BULLETIN  
OF THE  
Lowell Textile School

LOWELL, MASS.

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*Issued Quarterly*

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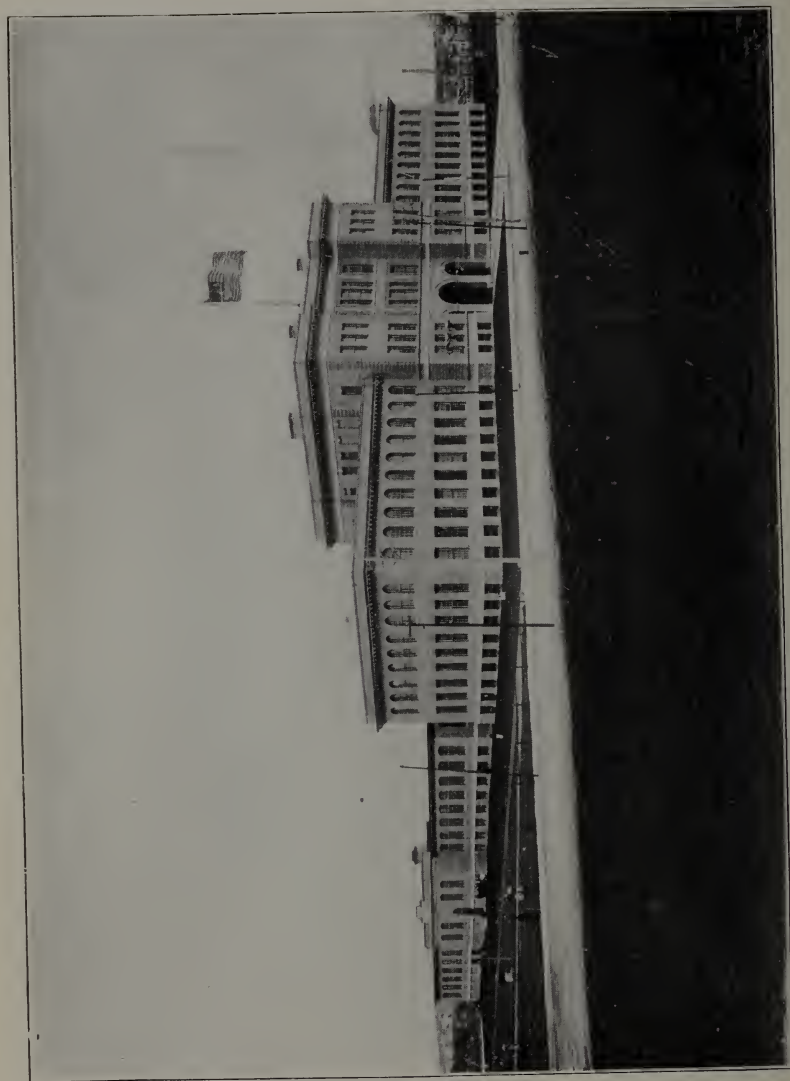
1908 - 1909

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Entered August 26, 1902, at Lowell, Mass., as second class matter,  
under Act of Congress of July 16, 1894.

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*Moody Street and Colonial Avenue*



KITSON HALL AND CAMPUS

SOUTHWICK HALL

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(Incorporated 1895)

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For Four Years, from July 1, 1907.

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*Chemistry and Dyeing*

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JAMES T. SMITH, Chairman      FREDERICK LAWTON

#### *Designing, Weaving and Finishing*

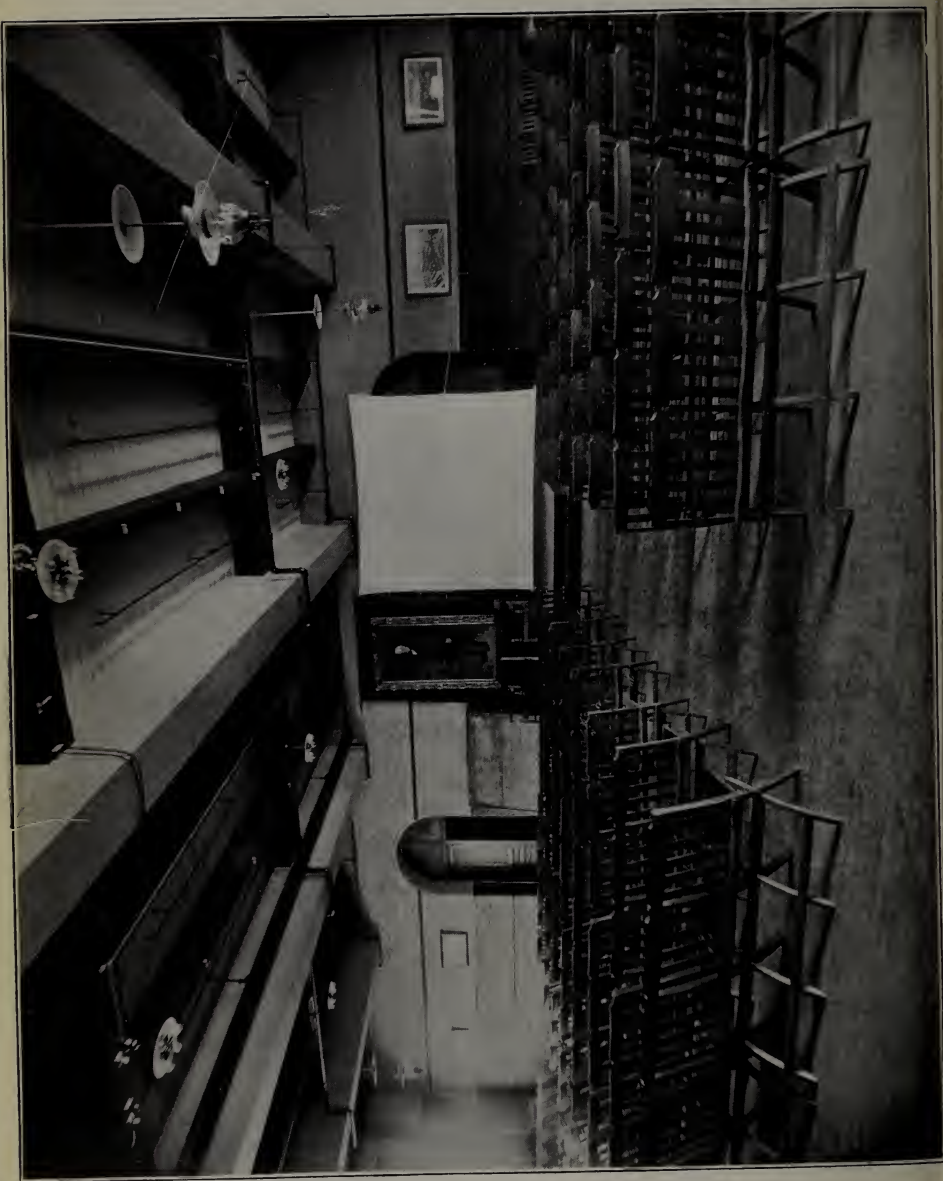
FREDERIC S. CLARK, Chairman      ROYAL P. WHITE  
WALTER E. PARKER

#### *Mechanical and Electrical Engineering*

HENRY A. BODWELL, Chairman      HAVEN C. PERHAM

#### *Athletics*

JAMES T. SMITH, Chairman  
WILLIAM R. MOORHOUSE      ROYAL P. WHITE



## ADMINISTRATION

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CHARLES H. EAMES, S. B., Principal of the School

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### Officers of Instruction

FENWICK UMPLEBY,

Professor of Textile Design and Fabric Structure;  
in charge of Department of Design and Power  
Weaving

LOUIS A. OLNEY, A. C.,

Professor of Chemistry; in charge of Department  
of Chemistry and Dyeing

EDGAR H. BARKER,

In charge of Department of Woolen and Worsted  
Yarns

GEORGE H. PERKINS, S. B.,

In charge of Department of Textile Engineering

ARTHUR A. STEWART,

In charge of Department of Finishing

STEPHEN E. SMITH,

In charge of Department of Cotton Yarns and  
Knitting

ARTHUR F. FERGUSON,

Instructor in Textile Design and Cloth Analysis

JOSEPH WILMOT,

Instructor in Power Weaving and Warp Preparation

RUSSELL W. HOOK,

Instructor in Dyeing

JOHN N. HOWKER,

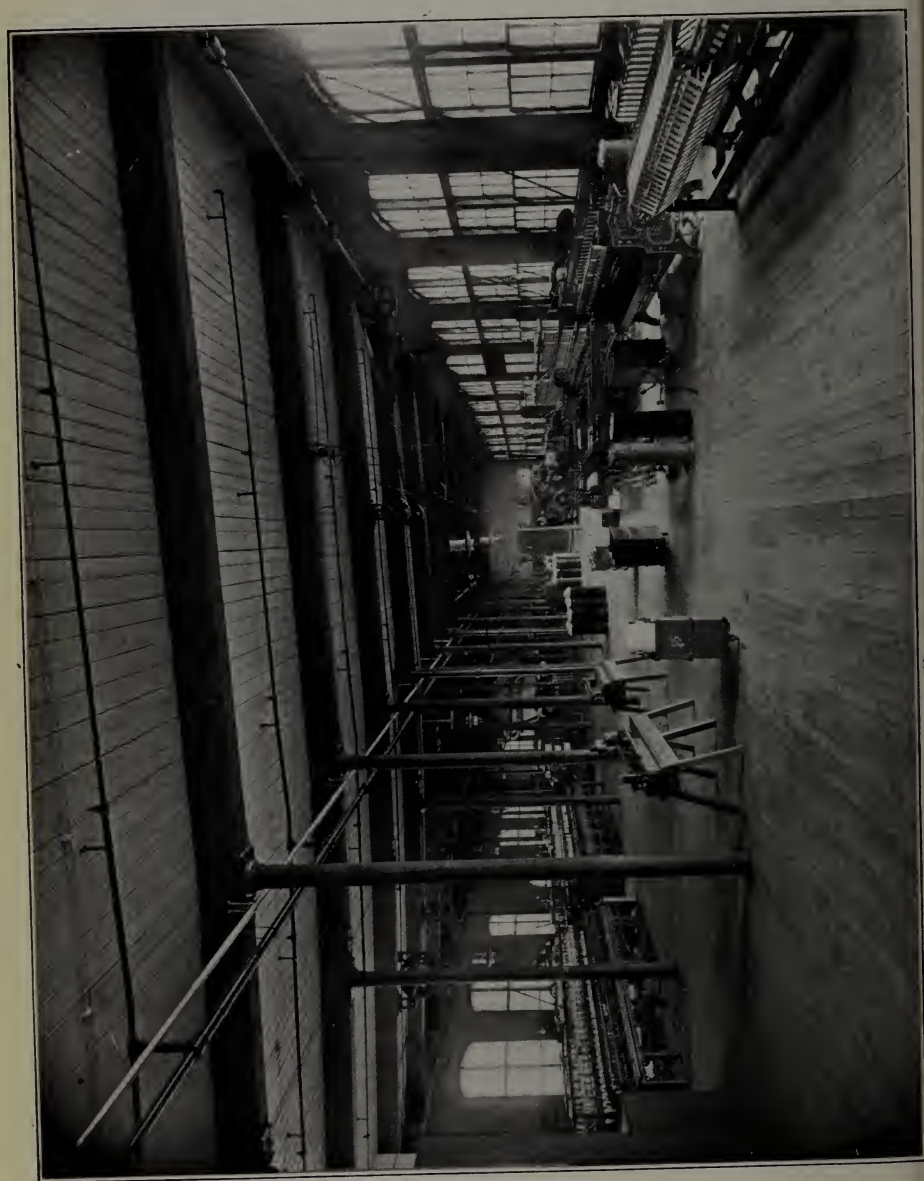
Instructor in Wool Sorting and Scouring

STEWART MACKAY,

Instructor in Hand Loom Weaving

ROBERT R. SLEEPER,

Instructor in Dyeing





### Officers of Instruction—Continued

- JOHN B. REED, A. B.,  
Instructor in Chemistry
- EUGENE W. CLARK, JR.,  
Instructor in Freehand Drawing and Decorative Art
- HERBERT J. BALL, S. B.,  
Instructor in Mechanical Engineering
- HENRY H. CROMPTON,  
Instructor in Worsted Yarns
- JOHN R. WALMSLEY,  
Instructor in Cotton Power Weaving
- ELIZABETH WHITNEY,  
Instructor in Freehand Drawing
- WALTER B. POPE, B. S.,  
Instructor in Chemistry
- ULYSSES J. LUPIN, S. B.,  
Instructor in Mathematics, Physics and Electrical  
Engineering
- ALBERT E. MUSARD,  
Instructor in Jacquard Weaving
- EUGENE C. WOODCOCK,  
Instructor in Woolen Yarns
- GEORGE A. CUSHMAN, A. M.,  
Instructor in Chemistry
- JAMES G. COMAN, B. Sc.,  
Instructor in Cotton Yarns
- PAUL E. KUNZER, PH. D.,  
Instructor in Commercial Languages
- FREDERICK A. WOOD, PH. D.,  
Instructor in English and History

### Faculty

CHARLES H. EAMES  
FENWICK UMPLEBY  
LOUIS A. OLNEY  
EDGAR H. BARKER

GEORGE H. PERKINS  
STEPHEN E. SMITH  
ARTHUR A. STEWART

# CALENDAR FOR 1908 - 1909

1908

1909

## JULY

S	M	T	W	T	F	S
			1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	31	

## AUGUST

S	M	T	W	T	F	S
						1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
$\frac{23}{30}$	$\frac{24}{31}$	25	26	27	28	29

## SEPTEMBER

S	M	T	W	T	F	S
		1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30			

## OCTOBER

S	M	T	W	T	F	S
				1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	31

## NOVEMBER

S	M	T	W	T	F	S
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30					

## DECEMBER

S	M	T	W	T	F	S
		1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30	31		

## JANUARY

S	M	T	W	T	F	S
						1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29
30						

## FEBRUARY

S	M	T	W	T	F	S
	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28						

## MARCH

S	M	T	W	T	F	S
	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30	31			

## APRIL

S	M	T	W	T	F	S
				1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	

## MAY

S	M	T	W	T	F	S
						1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
$\frac{23}{30}$	$\frac{24}{31}$	25	26	27	28	29

## JUNE

S	M	T	W	T	F	S
		1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30			

## CALENDAR

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### 1908

First entrance examinations, June 22 and 23, at 9 a. m.

Fall entrance examinations, September 14, 15, at 9 a. m.

Re-examinations and examinations for advanced standing, commence  
Friday, September 18, at 9 a. m.

Entrance examinations for evening students, Thursdays, commencing  
October 1, at 7 p. m., continuing until opening of classes.

Day school year begins Tuesday, September 29.

Evening school year begins Monday, October 19.

End of first five-week period of first term, October 31.

Thanksgiving recess, Thursday, Nov. 26 to Saturday, Nov. 28, inclusive.

End of second five-week period of first term, December 5.

Christmas recess, Thursday, Dec. 24, to Saturday, Jan. 2, 1909, inclusive.

### 1909

Semi-annual examinations begin Tuesday, January 19.

Second term begins Monday, February 1.

End of first five-week period of second term, March 6.

End of second five-week period of second term, April 10.

Annual examinations begin Tuesday, May 18.

Certificates awarded to Evening Graduates, May 5.

Diplomas awarded to Day Graduates, Thursday, June 3.

Entrance examinations, June 21 and 22, at 9 a. m.

There will be no sessions of the school on Washington's birthday or on  
Patriots' Day.



COTTON YARN DEPARTMENT

## THE LOWELL TEXTILE SCHOOL

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The Lowell Textile School was established, and is managed, by the Trustees of the Lowell Textile School of Lowell, Massachusetts, "for the purpose of instruction in the theory and practical art of textile and kindred branches of industry," as set forth in the act of incorporation.

The movement for the establishment of the School dates from June 1, 1891, but it was not opened for instruction until February 1, 1897.

Not only did the normal progress of the textile industry require such a school, but through the rapid development of the manufacture of the coarser cotton fabrics in the southern states, a crisis had arrived in the leading industry of New England which could only be met by wider and more thorough application of the sciences and arts for the production of finer and more varied fabrics.

Modeled on the lines of the department of the higher Polytechnic Institutes, it offers thorough instruction in the elements and principles of the sciences and arts applicable to textile and kindred branches of industry and also in their application to the manufacture of all varieties of textile fabrics, and the machinery required therefor.

In industrial education the distinction between Trade and Technical Industrial Schools is coming to be understood. The Lowell School belongs to the latter class. Beginning with limited equipment, instruction staff, and means, instruction at first was by Mill or Trade school methods—the pupil was brought directly to the machine, its parts explained to him, and its operation in manufacturing. The curriculum was, however, rapidly extended, department after department opened and equipped, and commodious and well adapted buildings provided for a permanent home.







While the progress of invention and the demands of ever changing markets will compel constant improvement in methods and additions to the very extensive equipment, the period of establishment is substantially closed with all departments open for instruction in all branches of the textile art under an extensive and able corps of instructors and assistant instructors.

Of the incorporators the permanent trustees (limited to twenty) are mainly representatives, as president, treasurer, agent, or superintendent, of the management of great textile or textile machine corporations of the Commonwealth, and associated with them are, ex-officiis, His Honor, the Lieutenant Governor and the Secretary of the State Board of Education, and two trustees appointed for four-year terms by the Governor and Council. Also the Mayor, Superintendent of Schools, the presiding officers of the two branches of the City Council, and a representative of the textile council of the city of Lowell. At the session of 1905 the Legislature authorized the graduates of the school to elect two additional trustees, and by an act of 1906 the number was increased to four for four-year terms, one being elected each year.

By the terms of the by-laws at least three-fourths of the permanent trustees must be persons "actually engaged in or connected with textile or kindred manufactures."

Lowell, Massachusetts, is called the "Mother Textile City of America," and in locating the school at this center a considerable advantage is secured for the reason that every commercial fibre is utilized in the products of the great Merrimack Valley Textile district. The practical work of the school is therefore kept closely in touch with the several branches of the industry which are included in the courses of study.

His Excellency, Governor Roger Wolcott, formally opened the school on January 30, 1897, there being present a large and representative gathering of gentlemen from the textile industries in all portions of New England. The regular classes of the school were opened on February 1, 1897, and have been regularly conducted since that time.

His Excellency, Governor John L. Bates, dedicated the buildings forming the permanent home of the school on February 12,



1903, in the presence of a large number of guests representing the Legislature as well as the educational, textile, and commercial interests of the Commonwealth.

It is found as time goes on that the applicants for day classes should enter more thoroughly prepared, and it now seems advisable that all students should enter the Lowell Textile School with a preparatory training which is the equivalent of that afforded by the regular four-year course of a standard high school. Even in such cases it is necessary to include in the curriculum of this school the branches of General Chemistry, Decorative Art, Mechanics and Advanced Mathematics. These subjects must be taught in a most thorough manner, for upon these depend the value and standing of the graduate in the great textile industries. While one may acquire at the school thorough knowledge of the principles of the sciences applicable in widely diverse lines of industry, the principles of science and art are taught with the particular view to their application to textile problems and processes. For graduates of universities and scientific institutions, special applied textile courses are offered or opportunities for experimental and original research work.

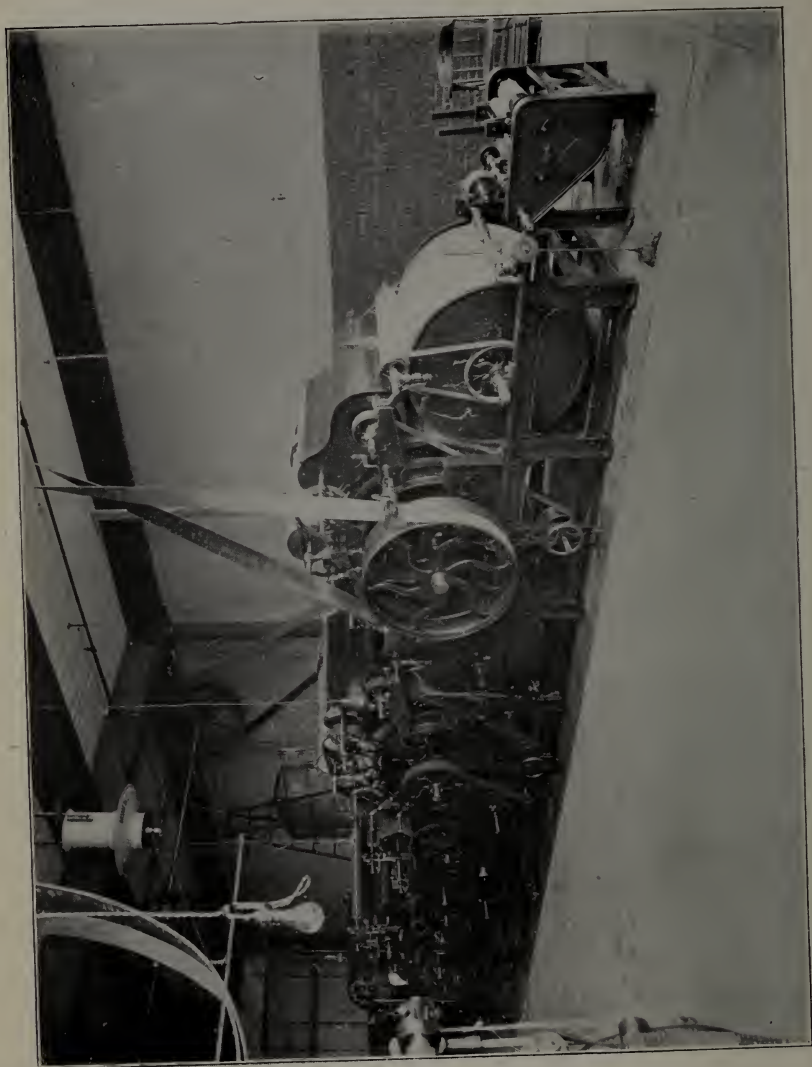
The mechanical equipment of the school includes the best makes of textile machinery, and these machines, while built as they would be for regular work, are, so far as possible, adapted to the experimental work which is of particular value in such an institution as this.

There is a more varied equipment in this school than in any other, either in America or Europe, and it is now possible to convert the raw stock into the finished fabric, within the school.

The growth of the school has been constant, as is evident from the fact that when it was opened February 1, 1897, there were 32 day and 110 evening pupils. January 1, 1908, the roster showed 129 day pupils and 483 evening pupils or 612 in all.

On January 1, 1903, the School was transferred from the rented quarters that it had occupied for five years to the site and buildings where it is permanently located.

The site is a commanding one, consisting of about eighteen acres at a high elevation, on the west bank of the Merrimack



WOOLEN AND WORSTED YARN DEPARTMENT

River, extending to and overlooking the rapids of Pawtucket Falls, the first to be utilized for power weaving in America on an extensive scale. The site was contributed by Frederick Fanning Ayer, Esq., of New York City, and the Proprietors of the Locks and Canals on the Merrimack River. To this site has been added three acres through the continued liberality of Mr. Ayer. The buildings consist of Southwick Hall, Kitson Hall, and one on Falmouth Street not yet named.

Southwick Hall includes a central mass 90 x 90 ft., having three stories and two wings 80 x 85 ft. with two stories and a well lighted basement. The building is pierced in the center by an arched way from which access is had to the wings and to the central courtyard. The northern wing is occupied by the General Offices, Engineering, Design and Finishing Departments, while the southern wing is entirely occupied by the Chemistry and Dyeing Departments. In the basement is located an Industrial Chemistry Laboratory for the manufacture of dyes from the crude material.

Kitson Hall makes a right angle with Southwick Hall and is 60 x 252 ft. with one story and a basement. It is occupied by the Cotton Yarn Department and heating, lighting, ventilating and power plant. The capacity of Kitson Hall was doubled during last year permitting of an extension of the Finishing Department, a Mechanical Engineering Laboratory, a Machine Shop, Evening Drawing Room, Students' Athletic Rooms, Store Rooms, etc.

Falmouth Street building forms the third side of the quadrangle and consists of two portions, one 75 x 130 ft., two stories, and the head house 70 x 80 ft., three stories and basement. This building is occupied by the Departments of Weaving and Wool Yarns. The head house is occupied by these departments, and contains equipment for French Spinning, Warp Preparation, Wool Scouring, Carbonizing and Conditioning. The upper floor contains the Hand Loom Department.

The buildings are all faced with light brick with granite and Indiana lime stone trimmings and are of modern mill construction adapted to educational uses. The floor space of the School is





WOOLEN AND WORSTED DEPARTMENT



quadrupled in the new home, permitting of a very large increase in equipment and is now occupied by the several departments as follows :

Cotton Spinning and Knitting .....	12,000	sq. ft.
Woolen and Worsted Spinning .....	20,700	" "
Decorative Art and Textile Design .....	12,400	" "
General Chemistry and Dyeing Laboratories .....	14,000	" "
Commercial Dyeing .....	4,570	" "
Industrial Chemistry .....	1,572	" "
Finishing Rooms .....	7,000	" "
Power Weaving .....	15,600	" "
Mechanical and Electrical Engineering .....	13,600	" "

The additional floor space is devoted to Administration Offices, Library, Assembly Halls, Class Rooms, Store Rooms, Power Heating and Ventilating Plant, etc.

Southwick Hall was contributed by the Commonwealth of Massachusetts and Frederick Fanning Ayer, Esquire, of New York City, and is a memorial to Royal Southwick, a leading textile manufacturer, a public man of earlier days, and a maternal ancestor of Mr. Ayer.

Kitson Hall, dedicated to the memory of Richard Kitson, was contributed by Charlotte P. Kitson and Emma K. Stott, his daughters; the Kitson Machine Company of Lowell, founded by him, was also a generous contributor.

## ADDITIONAL EQUIPMENT

Though from the first the management has kept in view the clearly defined objective which called for the establishment of the school, namely, the needs of the textile and kindred industries, it has developed its curriculum, its instruction methods, and equipment as those needs arose or became evident. At this writing its chemical and dyeing, decorative art, design, yarn and weaving departments are liberally housed, equipped, and provided with able instructors for the highest efficiency. This year the demand is for a very large addition to the mechanism, machine shop, and power production and application branches embraced by the title "Textile Engineering." Itemized schedules of additional equipment required for



these branches have been prepared by our engineers and approved by the Trustees involving a large expenditure and the installation is now in progress. This equipment is of the following character:

#### *Power Engineering Laboratory*

Corliss condensing engine, Curtis steam turbine, gas engine, surface condenser with connection for two varieties of steam engines, turbine, etc., absorption brake, gages, indicators, gas analysis apparatus, counters, planimeter, injectors, steam testing pump, anemometers, calorimeters, and a large variety of miscellaneous small apparatus.

#### *Applied Mechanics Laboratory*

Strength testing machine, 50,000 lbs., with accessories, transverse testing machine, torsion machine, cement and oil testing machines and accessories.

#### *Hydraulics and Fire Protection*

Motor driven fire pump, suction tank (cement) Pelton wheel, sprinkler tester, piezometer, meters.

#### *Machine Shop*

Engine lathes, speed lathes, drills, shaper, Universal milling machine, planer, tool grinder, motor, forges, pattern lathes, anvils, and a large variety of taps, dies, gages, reamers, and other small tools.

#### *Electrical Laboratory*

Direct current generators, shunt and series wound direct current motors, alternating current generators and motors, transformers, storage batteries, rotary transformers, switch board, testing instruments, galvanometers—Wheatstone, high resistance and slide wire bridges, photometer, and various accessories.

#### *Physical Laboratory*

Miscellaneous additions to present equipment.

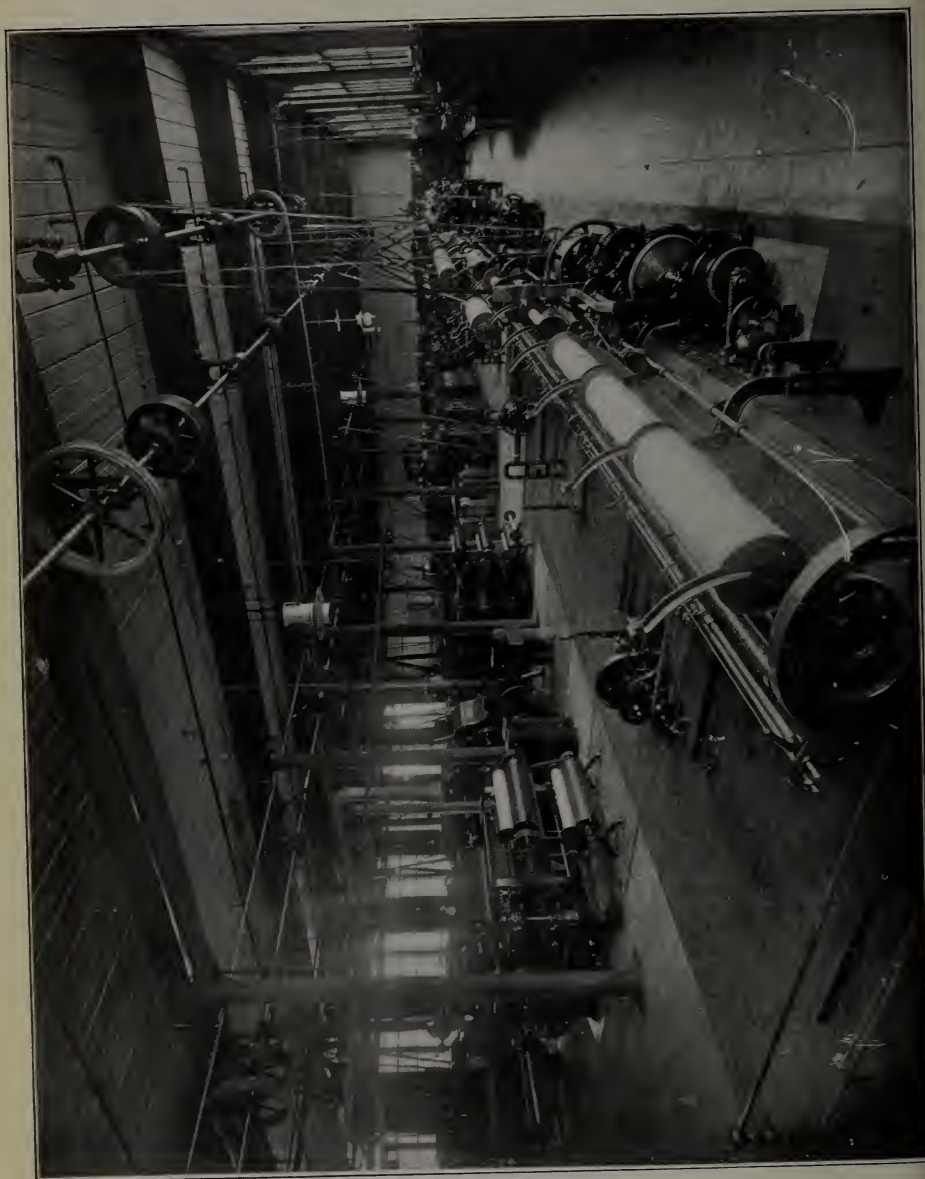
#### *Fibre Laboratories*

Varieties of machines for testing fibres, yarns and cloth.

#### *Chemistry and Dyeing Laboratory*

Oil and fuel testing apparatus and for extension of Industrial Chemistry laboratory equipment.

In addition apparatus for instruction and exercise in physical culture is being assembled.





## DAY CLASSES

These are especially intended for the instruction of those whose intention it is to enter the business of textile manufacturing in any branch. The courses are sufficiently complete to enable one to start without any previous acquaintance with textiles; but at the same time those who have been engaged in such business and wish to improve their knowledge and experience, can with profit pursue a course of study at the school.

Each course covers a period of three years, and at the satisfactory completion of which the regular diploma of the school is awarded.

There is one term of preliminary instruction, which is common to all courses. At the end of this term, each student is required to select the course he is to follow in his subsequent studies, and the instruction given from this point is specialized to suit each course.

The five regular diploma courses are:

- I. Cotton Manufacturing.
- II. Wool Manufacturing.
- III. Textile Designing.
- IV. Chemistry and Dyeing.
- VI. Textile Engineering.

## EVENING CLASSES

It is intended to give evening instruction to those who are engaged during the day in mills and work shops, to enable them to perfect their knowledge of the branches in which they work, to acquire knowledge of other processes than those in which they are regularly engaged, and to complete in the course of several winters, a thorough technical education without interfering with their daily duties.

The courses offered are similar to those of the day; but less time is devoted to the machine or laboratory work, since in most cases this is of small moment. Ordinarily the handling of the



WOOL SCOURING AND CARBONIZING



machinery is a part familiar to most of the students through contact with it in the day time, and in such cases the explanations and calculations are of the greater importance. In some cases it is possible to pursue two courses together, but this depends always on the arrangement of the schedule for any particular year.

All Evening Courses are free to residents of Lowell. All applicants must present satisfactory credentials showing that they are graduates of a Grammar School or school of higher standing, or they must pass entrance examinations in Arithmetic and English. For the first subject a short composition must be written on a given theme, and a certain amount must be written from dictation. In arithmetic the applicant must show suitable proficiency in addition, subtraction, multiplication, division, common and decimal fractions, percentage, ratio and proportion.

Courses are offered in:

- I. Cotton Spinning—2 years.
- II. (a) Woolen Spinning—1 year.  
(b) Worsted Spinning—3 years.
- III. Designing—3 years.
- IV. Chemistry and Dyeing—4 years.
- V. (a) Cotton Weaving—1 year.  
(b) Woolen and Worsted Weaving—1 year.  
(c) Dobby and Jacquard Weaving—1 year.
- VI. Mechanics and Electricity—3 years.  
Mechanical Drawing—3 years.  
Architectural Drawing—3 years.
- VII. Woolen and Worsted Finishing—1 year.

Course VI includes instruction in mechanism, electricity, steam engineering and mechanical drawing.

Classes are also formed for mathematics and freehand drawing.

List of subjects embraced in each course is similar to that of the day and may be found beginning on page 86.



FRENCH SPINNING DEPARTMENT

For the satisfactory completion of any of the above numbered courses, the certificate of the school will be awarded; the diploma of the school will be awarded in exchange for certificate of satisfactory completion of those subjects which go to make up any one of the regular diploma courses.

No diploma or certificate will be awarded until all dues to the school have been discharged.

Fee for each course for all except residents of Lowell, is \$5.00 per year payable in advance. All students, whether from Lowell or not, taking first or second year Chemistry and Dyeing Course, are required to make a deposit of \$5.00 at the commencement of the course. A deposit of \$10.00 will be required of all third and fourth year students taking this course. This is to cover the cost of laboratory breakages, and at the end of the year any unexpended balance is returned or an extra charge made for the excess breakage.

The schedule showing the arrangements of classes for each term will be announced at the opening of each term.

## **WOMEN'S DEPARTMENT**

Among the many fields in which woman has entered, none has been found in which her natural refinement of taste and skill can be used to better advantage than in designing; but natural ability, though the prime requisite, is by no means all, for a certain amount of technical knowledge must be gained to achieve success. This department combines decorative art and textile design, and regular attendance is required as in other departments.



TEXTILE DESIGN DEPARTMENT

## EQUIPMENT

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The equipment of machinery, inventoried January 1, 1908, at \$196,087.36, is the most varied for textile educational purposes, and is being constantly augmented. The builders of the various machines installed keep in close touch with the school, adding to the machines such improvements as are made from time to time. This operates to mutual advantage of student and manufacturer.

### COTTON DEPARTMENT

#### *Ginning*

- One 50 saw gin made by Daniel Pratt Gin Co., Prattville, Ala.
- One Prior Roller Gin.

#### *Opening, Picking and Waste Machinery*

An outfit of Kitson Picking Machinery from works of Kitson Machine Co., Lowell, Mass., including:

- One No. 7 Opener with Automatic Feeder connected by Robinson patent Cleaning Trunk to
- One 40 in. Single Beater Breaker Lapper with Condenser and gauge box feed.
- One 40 in. Single Beater Intermediate Finisher Lapper with Perham & Davis Sectional Plate Evenner, apron to double four laps.
- One 40 in. Single Beater Finisher Lapper with Perham & Davis Sectional Plate Evenner, apron to double four laps, Kirschner Patent Carding Beater.
- One Roving Waste Opener.
- One Thread Extractor.

#### *Carding, Combing and Drawing*

The following machinery made by the Lowell Machine Shop, Lowell, Mass.

- One Top Flat Card.
- Three Revolving Flat Cards.
- Two Railway Heads.
- Two Drawing Frames.

From Kitson Machine Company  
Stripping Rolls, etc.





SECTION OF THE HAND LOOM DEPARTMENT



From the Whitin Machine Works, Whitinsville, Mass.

One 40 in. Revolving Flat Card.

Card Grinding Rolls.

One Ribbon Lapper.

One Six Head Comber.

From the Mason Machine Works, Taunton, Mass.

One Sliver Lap Machine.

One Comb.

*Roving, Spinning and Twisting.*

From Lowell Machine Shop, Lowell, Mass.

One Slubber.

One Intermediate.

One Fine Frame.

One Jack Frame.

Three Ring Spinning Frames.

One Spinning Mule.

One Spooler.

One Wet and Dry Twister.

From Whitin Machine Works, Whitinsville, Mass.

Two Ring Spinning Frames.

*Miscellaneous Machinery of this Department includes:*

From the Lowell Machine Shop, Lowell, Mass.

One Reel.

One Model Fine Fly Frame.

One Model Fly Frame Compound.

One Model Card Feed.

One Model Flat Grinding Device.

One Model Scroll Setting Device.

From The Universal Winding Co.

One Six head Universal Winder, for cones, tubes or multiple winding.

From George W. Payne Co., Pawtucket, R. I.

One 12 Spindle Cone Winder.

From Draper Co., Hopedale, Mass.

One Weeks Banding Machine.

*Miscellaneous Machines.*

One Yarn Inspection Machine with black boards.

One Barbour Knotter.

Two Yarn Reels and Grain Scales.

One Power Yarn Tester.

One Twist Counter.



DECORATIVE ART DEPARTMENT

### Knitting Department

- One Mayo "Acme" Full Automatic Seamless Knitting Machine from Mayo Knitting Machine and Needle Co., Franklin Falls, N. H.
- One Geo. D. Mayo Full Automatic Seamless Knitting Machine from Geo. D. Mayo Machine Co., Laconia, N. H.
- One Brinton Full Automatic Seamless Knitting Machine from H. Brinton Co., Philadelphia, Pa.
- One McMichael and Wildman Rib Top Knitting Machine from Wildman Mfg. Co., Norristown, Pa.
- One Wildman Rib Knitting Machine, with Knee and Ankle Splicer and Automatic Stop Motion, Wildman Mfg. Co., Norristown, Pa.
- One Brinton Rib Knitting Machine with Knee and Ankle Splicer and Plaiter from H. Brinton Co., Philadelphia, Pa.
- One Wildman Rib Top Machine with Automatic Stop Motion from Wildman Mfg. Co., Norristown, Pa.
- One Grosser, One Section Jacquard Machine from Grosser Knitting Machine Co., N. Y.
- One Lamb Sweater Machine from Lamb Knitting Machine Co., Chicopee Falls, Mass.
- One Lamb Glove Machine from Lamb Knitting Machine Co., Chicopee Falls, Mass.
- One Branson Stocking Machine from Branson Knitting Machine Co., Philadelphia, Pa.
- One Beattie Looper from Beattie Machine Works, Cohoes, N. Y.
- One Hepworth Looper with Trimming Attachment from J. W. Hepworth and Co., Philadelphia, Pa.
- Five Sewing Machines, including two Shell Stitch Machines and three 2 and 3-thread Overseaming and Crocheting Machines, from Merrow Machine Co., Hartford, Conn.
- Five Sewing Machines, including machines for Overseaming, Double Stitch Covering, Seaming and Welting, Vest Finishing, etc., from Union Special Sewing Machine Co., Boston, Mass.

### WOOLEN AND WORSTED DEPARTMENT

#### *Wool Sorting and Grading*

This department is thoroughly equipped with benches, baskets, etc., for sorting wool in a convenient manner, and in addition there are samples of all grades and types of wool and other fibres.

#### *Scouring and Carbonizing*

Wool Scouring Machinery, C. G. Sargent's Sons Corp., Graniteville, Mass., consisting of

Cone Duster for Grease Wool.

Two Scouring Bowls, each 17 ft. x 24 in., with Parallel Rakes.



One Automatic Feeder for Scouring Bowls.  
One Automatic Feeder for Dryer.  
One Single Apron Dryer.  
Carbonizing Screw Acid Tank.  
Carbonizing Duster, with Crush Rolls.  
From North Chelmsford Machine Co.  
One Rinse Box.  
From Schaum & Uhlinger.  
One Hydro Extractor.

### Woolen

#### *Picking*

One Parkhurst Burr Picker, Atlas Mfg. Co., Newark, N. J.  
One Mixing Picker, Davis & Furber Machine Co., North Andover, Mass., equipped with Improved Mixing Picker Feed, and Spencer Oiler, both made by George S. Harwood & Son, Boston, Mass.

#### *Carding*

One set of Woolen Cards, including:

First Breaker, Second Breaker and Finisher, Davis & Furber Machine Co., North Andover, Mass.; this set of cards equipped with Bramwell First Breaker Feed, George S. Harwood & Son, Boston, Mass.; Torrance Balling Head and Creel, (Torrance Mfg. Co., Harrison, N. J.) between First Breaker and Second Breaker; Apperly Feed, (George S. Harwood & Son, Boston, Mass.) between Second Breaker and Finisher, and Combination Rub Rolls and Apron Condenser, (Davis & Furber Machine Co., North Andover, Mass.), on Finisher. These cards are for medium or coarse work.

One set of Davis & Furber Woolen Cards including:

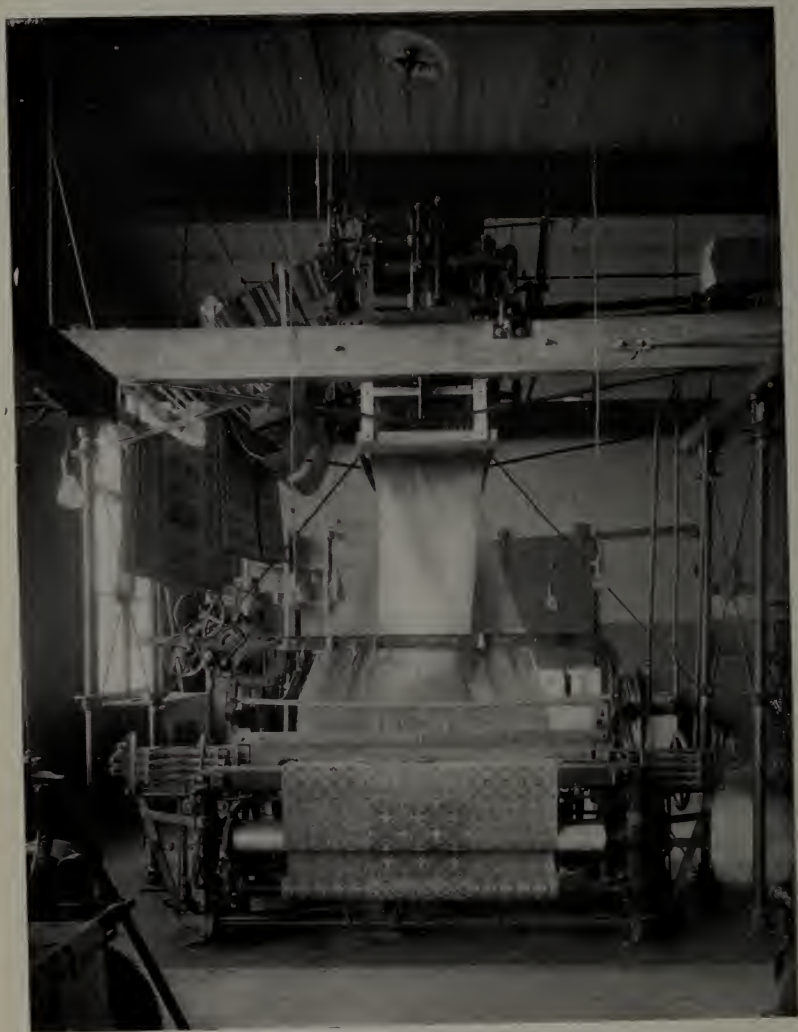
First Breaker, Second Breaker and Finisher. This set of cards equipped with Bramwell First Breaker Feed, (George S. Harwood & Son, Boston, Mass.); Apperly Feed with Kemp Traveller, (George S. Harwood & Son, Boston, Mass.), between First Breaker and Second Breaker; Bates Feed, (E. V. Bates, Lowell, Mass.), between Second Breaker and Finisher, and Davis & Furber Double Apron Condenser, on Finisher. These cards are for fine work.

One Sample Mixing Card, Torrance Mfg. Co., Harrison, N. J.

#### *Spinning*

One Spinning Mule, 120 spindles, Davis & Furber Machine Co., North Andover, Mass.; Bobbin Holders, supplied by American Bobbin Holder Co., W. Medway, Mass.





A TAPESTRY LOOM



One Spinning Mule, 120 spindles, Johnson & Bassett, Worcester, Mass.; Bobbin Holders supplied by Murdock & Geb, Franklin, Mass.

One 1907 Fancy Yarn Twister, 20 spindles, Davis & Furber Machine Co., North Andover, Mass.

#### *Card Grinding*

One Roy Grinding Frame, B. S. Roy & Son, Worcester, Mass.

Two Roy Traverse Grinders, B. S. Roy & Son, Worcester, Mass.

One Entwistle Traverse Grinder, T. C. Entwistle Co., Lowell, Mass.

One Complete set of Carders' Tools, W. H. Brown, Worcester, Mass.

### **Worsted**

#### *Carding*

One 50-inch Double-cylinder Worsted Card (4 lickerin), Davis & Furber Machine Co., North Andover, Mass., equipped with Bramwell Feed, George S. Harwood & Son, Boston, Mass.

#### *Backwashing*

One Double Bowl, Five Cylinder Backwasher, with Gill Box, Taylor-Wadsworth & Co., Leeds, Eng., equipped with blueing motion, oiling motion, and Layland Patent pressure motion.

#### *Gilling*

One Doubling Balling Head Gill Box (with double screws), Lowell Machine Shop, Lowell, Mass.

One Weigh Gill Box and Creel, Lowell Machine Shop, Lowell, Mass.

#### *Combing*

One Baller, (punch), Crompton & Knowles, Worcester, Mass.

One Noble Worsted Comb, Crompton & Knowles, Worcester, Mass.

#### *Gilling*

One Finishing Can Gill Box, Hall & Stell, Keighley, England.

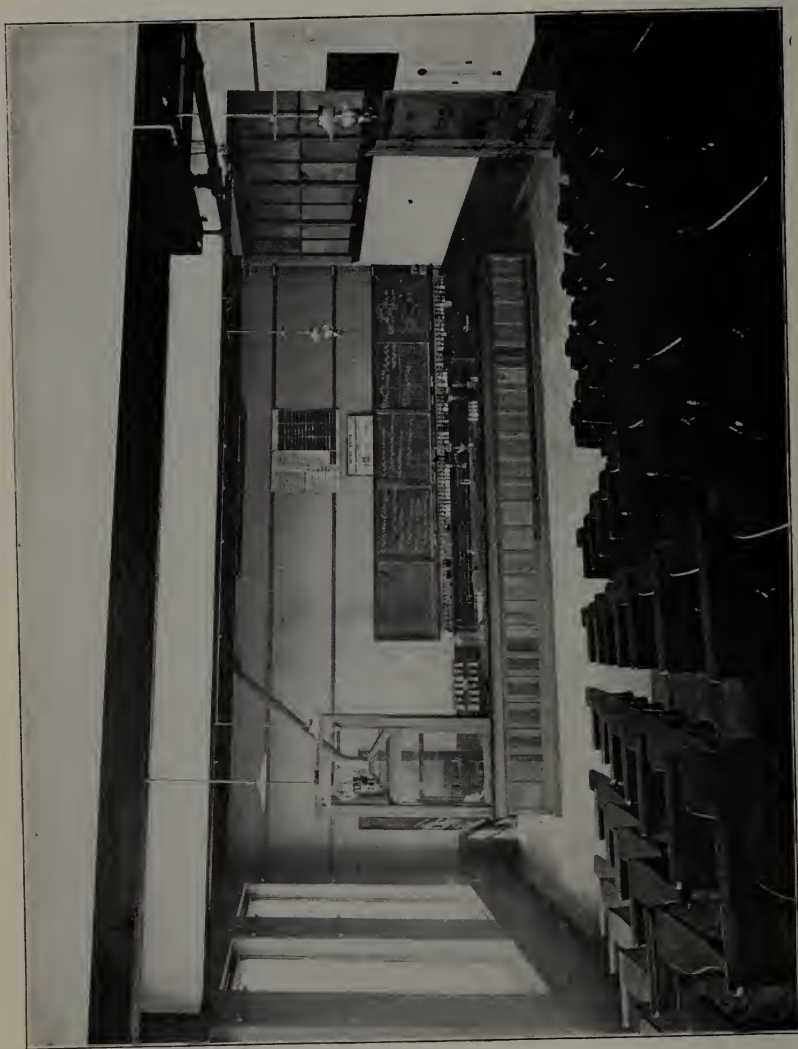
One Finishing Balling Head Gill Box, Hall & Stell, Keighley, England.

### **Bradford System of Drawing, Spinning and Twisting**

The following Drawing, Spinning and Twisting Machinery, from Prince Smith & Son, Keighley, England.

One Revolving Creel for 12  
Balls.

One Double Head Can Gill Box.  
One 2 Spindle Gill Box.



GENERAL CHEMISTRY LECTURE ROOM

One 2 Spindle Drawing Box.	One 12 Spindle Flyer Spinner.
One 2 Spindle Weigh Box.	One 12 Spindle Ring Spinner.
One 4 Spindle First Finisher.	One 12 Spindle 2 Fold Cap Twister.
One 12 Spindle Dandy Reducer.	One 12 Spindle 6 Fold Ring Twister.
One 12 Spindle Cap Spinner.	

The following Drawing, Spinning and Twisting machinery from the  
Lowell Machine Shop, Lowell, Mass.:

One 2 Spindle Drawing Box.	One 8 Spindle Cone Rover.
One 6 Spindle Second Finisher.	One 48 Spindle Cap Spinner, 4 ft. end
One 24 Spindle Dandy Rover.	One 48 Spindle Cap Spinner, 5 ft. end
One 6 Spindle Cone Reducer.	One 48 Spindle Boyd Ring Twister.

One Six Gang Universal Winder, equipped for cones or straight tubes,  
Universal Winding Co., Boston, Mass.

One Tape Band Sewing Machine, The Singer Mfg. Co., New York.

### French System of Drawing and Spinning

The machinery made by the "Societe Alsacienne de Constructions  
Mechaniques" at Mulhouse, France, consists of the following:

#### FRENCH NAMES

#### ENGLISH NAMES

Gill Box (2 têtes)	Gill Box (2 heads)
Étirage à Frottoirs (2 têtes)	1st Drawing (2 heads)
Étirage à Frottoirs (2 têtes)	2nd Drawing (2 heads)
Étirage à Frottoirs (2 têtes)	3rd Drawing (2 heads)
Étirage Réunion (4 Peignes)	Reducer (4 Porcupines)
Bobinier de Chûte (8 Peignes)	Slubber (8 Porcupines)
Bobinier (8 Peignes)	1st Intermediate (8 Porcupines)
Bobinier (8 Peignes)	2nd Intermediate (8 Porcupines)
Bobinier (8 Peignes)	Rover (8 Porcupines)
Finisseur (16 Peignes)	Finisher (16 Porcupines)
Selfacting à Filer (150 Broches)	Selfacting Mule (150 Spindles)

#### *Yarn Weighing and Testing*

From Lowell Scale Company:

One Large Platform Scale.

From Howe Scale Co.

One Dram Scale.

One Gramme Scale.

One Ounce Scale.

One Pound and Ounce Scale.

Two Yarn Reels.

One Roving Reel.

Three Grain Scales.

One Run Beam.



EXPERIMENTAL DYEING LABORATORY

One Hand Yarn Strength Tester.  
Two Twist Counters.  
One Barbour Knotter.

## DESIGN AND POWER WEAVING DEPARTMENT

### *Cotton Warp Preparation*

One Spooler, Lowell Machine Shop, Lowell, Mass.  
One Warper, Lowell Machine Shop, Lowell, Mass.  
One Slasher, Lowell Machine Shop, Lowell, Mass.  
One Beamer, T. C. Entwistle Co., Lowell, Mass.  
One Winder, Altemus & Co., Philadelphia, Pa.  
One 400 End Improved Draper Warper, Draper Co., Hopedale, Mass.  
Drawing-in Frames, etc.  
One Pat. Slasher Press Roll, J. Battles & Co., Lawrence, Mass.  
One Pat. Expansion Comb for Warper, T. C. Entwistle Co., Lowell, Mass.  
One Quiller, Johnson & Bassett, Worcester, Mass.  
One Wet and Dry Twister, Draper Co., Hopedale, Mass.  
Set of six in. spools for Warper, Macrodi Fiber Co., Woonsocket, R. I.

### *Woolen and Worsted Warp Preparation*

The equipment for this work includes a Jack Spooler, a Dresser, Reel, Beamer and a 48 Spool Creel all made by the Davis & Furber Machine Co., North Andover, Mass. There are also a number of hand warping and beaming frames.

### *Braiding Machinery*

One 24 Line Hercules Braider.  
One 12 Line Braider.  
One Tubular Braider.  
One Sautach Braider.  
All made by the New England Butt Co., Providence, R. I.

### *Silk Preparing Machinery*

One Winder, Atwood Machine Co., Stonington, Conn.  
One Ribbon Quiller, Atwood Machine Co., Stonington, Conn.  
One Warper and Beamer, Swiss Style, Atwood Machine Co., Stonington, Conn.  
One Double Frame, Atwood Machine Co., Stonington, Conn.

### *Plain Looms*

One Plain Northrop Loom, Draper Co., Hopedale, Mass.  
One Plain Print Cloth Loom, Whitin Machine Works, Whitinsville, Mass. To this is attached a Kip-Armstrong Warp Electric Stop Motion.





EXPERIMENTAL PRINTING LABORATORY



One Plain Print Cloth Loom, Mason Machine Works, Taunton, Mass.  
 One Kilburn & Lincoln Plain Loom.  
 Eight Lowell Machine Shop Plain Looms.  
 One English Loom, Hattersley.  
 One Improved Northrop Loom, fine sateen, Draper Co., Hopedale, Mass.  
 One Northrop Loom with dobby, Draper Co., Hopedale, Mass.  
 One Side Cam Twill Loom, Whitin Machine Works, Whitinsville, Mass.  
 One Five Harness Sateen Loom, Lowell Machine Shop, Lowell, Mass.  
 One Harriman Automatic Shuttle Changing Loom.  
 One Lewiston Machine Co. Loom, 4 harness, side cam.  
 One Crompton Jean Loom.

### *Fancy Looms*

One Lewiston Machine Co. Bag Loom.  
 One Knowles Gingham Loom, 4 boxes, Crompton-Knowles Loom Works.  
 One Crompton Gingham Loom, 4 x 1 boxes, Crompton-Knowles Loom Works.  
 One Crompton Towel Loom, 2 x 1 boxes, Crompton-Knowles Loom Works.  
 One Crompton Lappet Loom, with 16 harness dobby, Crompton-Knowles Loom Works.  
 One Knowles Fancy Cotton Loom, 20 harness dobby, 4 boxes, for fancy leno work, Crompton-Knowles Loom Works.  
 One Knowles Fancy Cotton Loom, 25 harness dobby, Crompton-Knowles Loom Works.  
 One Crompton Fancy Cotton Loom, single cylinder, 20 harness dobby, Crompton-Knowles Loom Works.  
 One Knowles Gem Loom, 20 harness, 4 x 4 boxes, Crompton-Knowles Loom Works.  
 One Crompton Worsted Loom, 24 harness, 4 x 4 boxes, Crompton-Knowles Loom Works.  
 One Crompton Fancy Loom, 6 x 1 double cylinder, 20 harness dobby, Crompton-Knowles Loom Works.  
 One Twenty Harness Dobby Loom, Whitin Machine Works, Whitinsville, Mass.  
 One Crompton & Knowles Heavy Loom, 20 harness, 4 x 4 boxes, Crompton-Knowles Loom Works.  
 One Knowles Blanket Loom, 25 harness dobby, 4 boxes, Crompton-Knowles Loom Works.  
 One Knowles Worsted Loom, 32 harness, 4 x 4 boxes, Crompton-Knowles Loom Works.  
 Three Knowles Heavy Woolen Looms, 25 harness, 4 x 4 boxes, Crompton-Knowles Loom Works.  
 One Model Dobby Attachment.



VIEWS IN INDUSTRIAL CHEMISTRY LABORATORY

### *Jacquard Looms*

- One 400 hook Schaum and Uhlinger Jacquard Machine.
- One Knowles Fancy Loom, single lift Jacquard, Crompton-Knowles Loom Works.
- One Knowles Fancy Loom, double lift Jacquard, Crompton-Knowles Loom Works.
- One Knowles Fancy Loom, Jacquard tied up for leno, Crompton-Knowles Loom Works.
- One Knowles Ingrain Carpet Loom, 4 x 4 boxes, Crompton-Knowles Loom Works.
- One Crompton Ingrain Carpet Loom, 4 x 4 boxes, Crompton-Knowles Loom Works.
- One Stafford Silk Loom, 1200 hook Halton Jacquard, Crompton-Knowles Loom Works.
- One Crompton & Knowles 72 in. Tapestry Loom, 2600 hook Tapestry Jacquard Head, Crompton-Knowles Loom Works.
- One Jacquard Piano Card Cutting Machine, John Royle & Sons, Paterson, N. J.

### **Hand Loom Weaving**

- Twelve Hand Looms, 3 x 3 boxes, 20 harness dobby.
- Eight Hand Looms, 4 x 4 boxes, 24 harness dobby.
- Eight Hand Looms, 3 x 3 boxes, 32 harness dobby.
- Six Hand Looms, 4 x 4 boxes, 30 harness dobby.
- Two Hand Looms, 4 x 4 boxes, 32 harness dobby.
- Two Hand Looms, 4 x 4 boxes, 200 hook Jacquard.
- Two Hand Looms, 3 x 3 boxes, 200 hook Jacquard.
- Two Hand Looms, 3 x 3 boxes, 600 hook Jacquard.
- One Hand Loom, 48 harness.
- Two Hand Looms with treadles.
- Pattern Warping Stands.
- Beaming, drawing-in stands, etc.

### **CHEMISTRY AND DYEING DEPARTMENT**

#### *Chemical Laboratories*

- The General Chemistry and Qualitative Analysis Laboratory includes:
  - One hundred and twenty laboratory desks, each containing a full set of apparatus for the first year's work in chemistry; also gas and water fittings, reagents and sinks.
- Four Large Double Hoods.
- Two Steam Baths.
- One Parson's Automatic Gas Generator.



VIEW IN COMMERCIAL DYEING LABORATORY

### *Quantitative Laboratory*

- One Water Distilling Apparatus.
- One Steam Drying Closet and Several Drying Ovens.
- One Large Steam Bath.
- One Electrolytic Table.
- Five Hoods.
- Thirty-six laboratory desks, each fully provided with apparatus.

### *Balance Room*

- One Large Christian Becker Analytical Balance.
- Six Small Christian Becker Analytical Balances.
- One Standinger Analytical Balance.
- One Eimer & Amend Analytical Balance.
- One H. L. Becker's Son & Co. Analytical Balance.

### *Combustion Room*

- One Combustion Furnace, 25 burners.
- One Lothar Meyer's Furnace for tubes.
- One Kerosene Burner Muffle Furnace.

### *Microscopic and Colorimetric Laboratory*

- Two Benches for microscopical work.
- Three Bausch & Lomb Compound Microscopes.
- One Nachet et Fils Compound Microscope.
- One Tintometer.
- Desk and shelves for the apparatus and reagents necessary for this branch of the work.
- Adjoining this laboratory is a dark room for Spectrum Analysis, Photometric Work etc.

### *Assistant Instructors' Laboratory*

- One Large Case of chemicals.
- One Double Hood.
- One Copper Water Bath.
- One Soapstone Sink with a drain board.
- Benches, desks and complete fittings for water, gas and suction.

### *Private Laboratory*

- One Christian Becker Balance.
- One large B. & L. Microscopè.
- One Parr Calorimeter.
- One Case for Chemicals and Apparatus.
- Three Laboratory Benches, with necessary fittings.
- One Large Hood.
- One Steam Bath.
- One Experimental Dye Apparatus.
- One Porcelain Sink and Drain Board.





FINISHING DEPARTMENT



### *Chemical Lecture Room*

Is provided with a lecture table fully equipped with gas, water, sinks, a hood and sufficient apparatus for lecture experiments.

An electric arc reflectroscope provided with suitable screen, which makes it possible to illustrate a lecture either from slides or by cuts, photographs or objects.

Seats are provided for 80 students, and are arranged on a raised floor so that every student has a full view of the lecture table.

This room contains various collections of dye stuffs and chemicals for exhibition and for lecture demonstration.

### *Experimental Dyeing Laboratory*

The dyeing laboratory is equipped with individual benches, small dyeing apparatus, reels, balances, apparatus for dye testing, such as frames for exposing dyed material to light, and a complete collection of dyestuff samples and sample cards.

One Small Hydro-Extractor, from W. H. Tolhurst & Son, Troy, N. Y.  
Twenty-four Steam Jacketed Experimental Dyeing Machines.

One Drying Chamber.

One Ageing Chamber.

### *Experimental Printing Laboratory*

One Calico Printing Machine, made by Mather & Platt, Oldham, England.

One Iron Jacketed Steaming Chamber from A. Edmeston & Son, Salford, England.

One set of Steam Jacketed Copper Kettles.

### *Industrial Chemistry Laboratory*

One Filter Press, Type E, T. Shriver and Co.

One Single Acting Triplex Plunger Pump, Gould's Mfg. Co.

One Vacuum Drying Apparatus, Norman Hubbard's Sons.

One Surface Condenser, Norman Hubbard's Sons.

One Packard Vacuum Pump, Norman Hubbard's Sons.

One Vacuum Evaporator, Swenson System, American Foundry and Machine Co.

One Centrifugal, C. H. Chavant and Co.

One Double Jar Mill, F. I. Stokes and Co.

One Sturtevant Ore Crusher.

One Sturtevant Pulverizer.

Ten Copper Steam Baths, D. H. Wilson and Co.

One General Electric Company 7 1-2 H. P. Motor.

One 36 in. Ventilating Fan, Mass. Fan Co.

One Autoclave.

Twenty-four Lockers.

Two Concrete Top Tables.



FINISHING DEPARTMENT

### *Commercial Dyeing Laboratory*

- One Kier, Atlantic Works, East Boston, Mass.
- One small Kier, fitted with E. D. Jefferson's circulating device.
- One 4 String Dyeing Machine, Rodney Hunt Machine Co., Orange, Mass.
- One Mercerizing Machine.
- One Raw Stock Dyeing Machine, Klauder-Weldon Dyeing Machine Co., Amsterdam, N. Y.
- One Yarn Dyeing Machine, Klauder-Weldon Dyeing Machine Co., Amsterdam, N. Y.
- One Jig Dyeing Machine, The Textile-Finishing Machinery Co., Providence, R. I.
- One set of Drying Cans, The Textile-Finishing Machinery Co., Providence, R. I.
- One Chain Dyeing Machine, T. C. Entwistle Co., Lowell, Mass.
- One Raw Stock Drying Table, Philadelphia Textile Machinery Co., Philadelphia, Pa.
- One Padding Machine, Arlington Machine Works, Arlington, Mass.
- One Hydro-Extractor, W. H. Tolhurst & Son, Troy, N. Y.
- Seven Dye Tubs.
- One Power Yarn Reel.
- One Reeves' Variable Speed Device.
- Two Trucks.

### **FINISHING DEPARTMENT**

- One 2 string Washer, Rodney Hunt Co., Orange, Mass.
- One Fulling Mill, Rodney Hunt Co., Orange, Mass.
- One Up and Down Dry Gig, Curtis & Marble, Worcester, Mass.
- One Rolling and Stretching Machine, Curtis & Marble, Worcester, Mass.
- One Up and Down Wet Gig, Curtis & Marble, Worcester, Mass.
- One Steam Finishing Machine, Curtis & Marble, Worcester, Mass.
- One Two Cylinder Double Acting Brushing Machine, Curtis & Marble, Worcester, Mass.
- One 60 in., 4 Cylinder Sanding and Polishing Machine, Curtis & Marble, Worcester, Mass.
- One Kicking Mill, James Hunter & Co., North Adams, Mass.
- One 6-4 Double Shear, Parks & Woolson, Springfield, Vt.
- One 6-4 Voelker Rotary Press, G. W. Voelker & Co., Woonsocket, R. I.
- One Tentering and Drying Machine, John Heathcote, Providence, R. I.
- One Single Crabbing Machine, H. W. Butterworth & Son, Philadelphia, Pa.
- One 72 in., Woolen Napper, Davis & Furber, North Andover, Mass.



CLOTH OF STUDENTS' MANUFACTURE

- One 32 in., Basket Hydro-Extractor, W. H. Tolhurst & Son, Troy, N. Y.
- One Measuring and Folding Machine, Parks & Woolson, Springfield, Vt.
- One Sewing Machine, Birch Brothers, Somerville, Mass.
- Soap tanks, perch, burling and measuring tables.

## ENGINEERING DEPARTMENT

### PHYSICAL LABORATORY

Through the generosity of a friend of the School a laboratory has been provided with the most approved apparatus for testing the physical properties of all fibres, yarns, and fabrics; the equipment includes:

- One Bausch and Lomb D. D. Microscope.
- Two inch, 1 inch, and 1-2 inch regular eyepieces.
- Three-fourths inch (photographic), 2-3 inch, 1-6 inch, 1-12 inch (oil immersion) objectives.
- One Nicol prism polarizer and analyzer.
- One Eye Piece Micrometer.
- One Filar Micrometer, (1 inch equivalent eyepiece) for refined diameter determinations.
- One Standard Glass Stage, divided to 1-10 and 1-100 m. m. with corrections as tested against the International m. m.
- Complete outfit for mounting slides.
- Complete outfit for photo micrography.
- Camera Lucida.
- Microtome Sectioning Outfit.
- One Small Skein Testing Machine.
- One set Conditioning Ovens for moisture determination.
- One Yarn Testing Machine, adjusted to test strength, twist, take up, elasticity, and stretch.
- One Hydraulic Cloth Strength Testing Machine.
- One Brown & Sharpe Metre Reel.
- Miscellaneous apparatus for experiments in Mechanics, Heat, Light, Sound and Electricity.

### ENGINEERING LABORATORY

The engineering laboratory contains the following equipment:

- 50 H. P. Corliss engine arranged for experimental work with surface condenser, air and circulating pumps. Weighing and suction tanks and scales, for water measurements, for boiler, engine and pump tests.
- 35 K. W. Curtis steam turbine and alternating current generator.
- Absorption brake for Corliss engine.





MECHANICAL ENGINEERING CLASS ROOM



Triplex power pump 4 in. x 6 in.  
 Air Compressor (belted) 6 in. x 6 in.  
 Pressure tank 72 in. x 24 ft., giving heads up to 300 feet and arranged  
 with connections, for experimental work in hydraulics.  
 Two concrete storage tanks 2500 gals. capacity each.  
 Direct acting steam pump for testing purposes.  
 One centrifugal pump.  
 One rotary pump.  
 Silver & Gay differential transmission dynamometer.  
 Variable speed transmission.  
 Two fan blowers for testing purposes.  
 One water ram.  
 Nozzles, weirs, etc., for hydraulic experiments and a variety of ac-  
 cessory apparatus such as steam and gas engine indicators, plani-  
 meters, calorimeters, injectors, gauges, counters, anemometers,  
 and thermometers are also available.  
 Apparatus for chimney gas analysis. Coal calorimeters are also avail-  
 able in the chemistry department.  
 In addition to the above equipment the extensive power plant includ-  
 ing boilers, engines, steam and gas, heaters, and heating fans,  
 ventilating fans, generators and motors afford further opportunity  
 for extensive experimental work on apparatus in daily service.  
 One 4 H. P. G. E. Electric Dynamometer which may be used as a  
 double current generator or rotary transformer receiving direct  
 current at 220 volts and delivering three phase alternating current  
 which by a step-up transformer will give 220 volts at 60 cycles.  
 One 5 H. P. induction motor.  
 One 250 volt Weston Portable Voltmeter.  
 One 250 volt Weston Portable Voltmeter with calibrating coil.  
 One 150 ampere Weston Portable Ammeter.  
 One Weston Portable Millivoltmeter with 200 milli-volt and 20 milli-  
 volt scales.  
 One 2 ampere and one 20 ampere shunt for use with above instrument  
 as an ammeter.  
 Set of alternating current instruments.  
 One D'Arsonval Reflecting Galvanometer.  
 One Simple Galvanometer.  
 One Wheatstone Bridge.  
 Two Direct Current Self Feeding Arc Lamps.  
 Two Hand Feed Arc Lamps for stereopticons.  
 Resistance boxes of various sizes and other apparatus necessary for  
 commercial testing of lamps, motors, etc.  
 An Exhibition Board containing samples of the Chloride and Exide  
 Storage Battery Plates donated by the Electric Storage Battery  
 Co. of Philadelphia.  
 One Buff and Buff Engineer's Transit.  
 One Philadelphia Level Rod.  
 One Fortin Mercury Barometer.



MECHANICAL DRAWING ROOM

## MACHINE SHOP

The machine shop includes the following list of equipment and a fully equipped tool room:

- One 14 in. x 6 ft. standard engine lathe.
- One 14 in. x 6 ft. quick change engine lathe.
- One 18 in. x 10 ft. standard engine lathe with taper attachment.
- Two 11 in. x 5 ft. speed lathes.
- One 20 in. upright drill.
- One 14 in. sensitive drill (single spindle)
- One 24 in. x 24 in. x 6 ft. planer.
- One Universal Milling Machine.
- One 20 in. wet tool grinder.
- One twist drill grinder.
- One 12 in., 2-wheel grinder.
- One 36 in. x 6 in. grindstone and frame.
- One single spindle centering machine.
- One power hack saw.

These tools are equipped with chucks, tools, etc., for a great variety of work.

In addition to this list are benches for such work as chipping, filing, scraping, etc., and forges with full equipment. In the wood working shop, besides benches for pattern work, are the following machines:

- One 16 in. x 8 ft. pattern maker's lathe.
- One single saw bench.
- One 36 in. band saw.

## POWER, LIGHT, HEAT AND VENTILATING PLANT

- One 300 H. P. Aultman and Taylor Horizontal Water Tube Boiler, equipped with U. S. Rocking Grates.
- Two 100 H. P. Stirling Water Tube Boilers.
- These boilers are connected to a Sturtevant Induced Draft Apparatus, including fan, direct connected to the Sturtevant vertical engine and equipped with two way dampers.
- One Sturtevant Smoke Filtering Apparatus.
- One Locke Steam Pressure Regulator for draft engine.
- One Knowles Boiler Feed Pump, 6 in. x 4 in. x 6 in.
- One Warren Webster Feed Water Heater, Filter and Oil Extractor.
- One Payne 14 in. x 14 in. Automatic High Speed Engine of 125 H. P.
- One 9 1-2 in. x 11 3-4 in. Nash Gas Engine of 50 H. P. of the four cycle type, with speed regulating clutch and hit and miss governor.
- One Motor Driven Air Compressor 5 1-2 in. x 6 in. with a storage tank of 20 cubic feet capacity, 100 lbs. per sq. in. pressure.
- One Complete Sturtevant Double Duct System for heating Southwick Hall. This apparatus is designed to provide the proper amount of fresh warm air called for by the State law as applied to educational



SOUTHWICK HALL

KITSON HALL  
ATHLETIC FIELD

institutions, and includes a 9 ft. x 4 ft. fan direct connected to the Sturtevant horizontal engine, drip tank and Knowles automatic return pump, 4 1-2 in. x 2 3-4 in. x 4 in. arranged to deliver either to the feed water heater or to the boilers direct.

Complete Ventilation System for Southwick Hall and Falmouth Street Building including 6 direct connected motor driven exhaust fans.

One Sturtevant Fan and Heater for Kitson Hall and Falmouth Street Building, direct connected to a Sturtevant inverted engine.

One Cross Oil Filter.

One Complete Moistening Apparatus installed by the American Moistening Co., Boston, Mass., including Knowles triplex 4 x 4 power pump, tank, and 20 moistening heads.

One Complete Sprinkler System for fire protection, using the Grinnell glass button heads.

One Bullock 75 K. W. Direct Current Multipolar Compound Generator, wound for 220 volts, over compounded 20 volts from no load to full load. This is direct connected to the Payne engine.

One Bullock 30 K. W. Generator of the same type, direct connected to the Nash gas engine.

The switchboard is arranged so that either unit may be thrown in independently on the power or lighting feeders or the two machines may be run in parallel. The lighting circuits are on the two wire 220 volt system and supply the equivalent of 1030—16 candle power lamps. The power circuits are on the same system and supply approximately 170 H. P. in motors.

Three 24 H. P. Bullock Motors.

One 20 H. P. General Electric Motor.

One 10 H. P. Allis Chalmers Motor.

Two 7 1-2 H. P. General Electric Motors.

Four 15 H. P. Bullock Motors.

One 3 H. P. Motor, New England Motor Co.

One 2 H. P. Motor, Holtzer-Cabot Electric Co.

### Athletic Field

Through the generosity of Mr. Frederick Fanning Ayer, the school has been provided with a Campus and Athletic Field of about three acres. This has been carefully graded and laid out for base ball, foot ball and track athletics. Bleachers have been provided which are used for either the out-of-door games or for basket ball played in a hall specially equipped for this game.

In the basement of Kitson Hall there has been provided a recreation room for the use of the students at such times as their attendance is not required in classes. This room is also used by those who take part in athletics, and connected to it is a smaller room provided with shower baths, lockers and toilets. Both rooms are easily accessible to the Campus by way of the outer door of Kitson Hall.

The athletic interest is growing yearly and receives the encouragement of the management.





BOILER ROOM



## DAY CLASSES

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### Entrance Qualifications

Candidates for admission are accepted upon presentation of properly vouched certificates showing the completion of a regular four year High School course. For all others, there are held examinations, as stated in calendar; candidates failing to pass at June examinations are allowed to try again in September; those who cannot attend the June examinations, may present themselves in September.

The Calendar of examinations is as follows:

Monday, June 22, 1908; September 14, 1908; and June 21, 1909:

Algebra	9 to 11 A. M.
Geography	11 A. M. to 1 P. M.
English	2 to 4 P. M.

Tuesday, June 23, 1908; September 15, 1908; and June 22, 1909:

Geometry	9 to 11 A. M.
History	11 A. M. to 1 P. M.
Arithmetic	2 to 4 P. M.

### Algebra

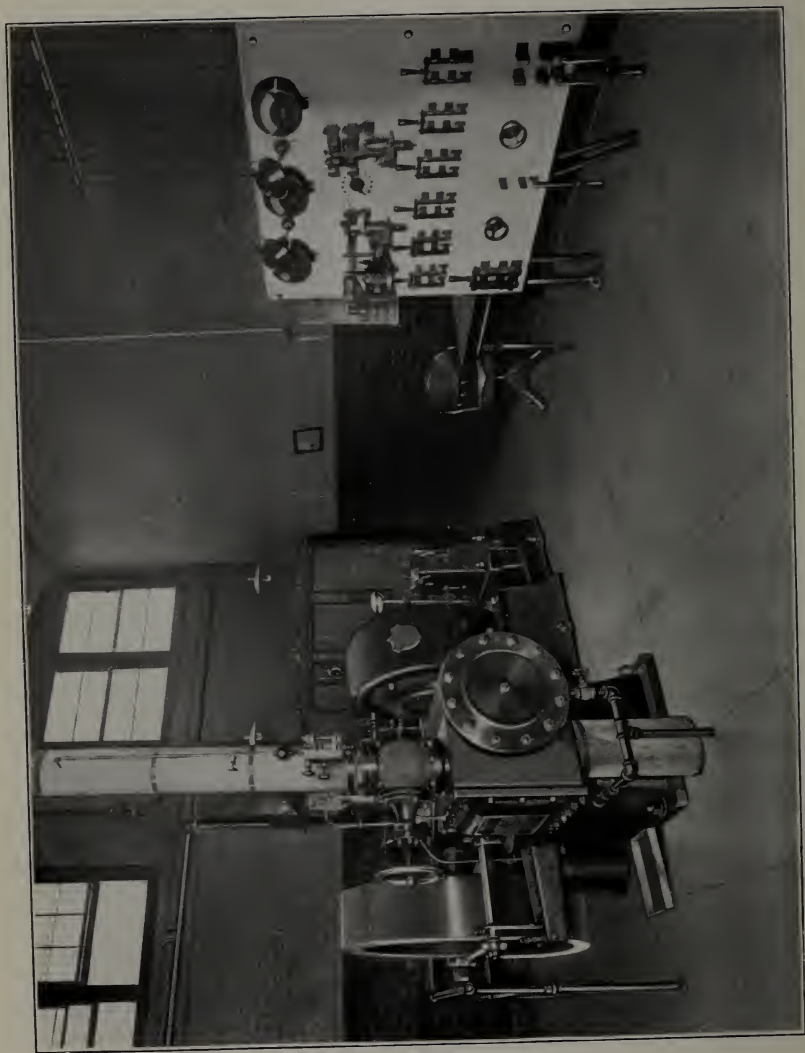
Fundamental operations, parenthesis; factoring; highest common factor; least common multiple; fractions, simple and complex; simple equations, one or more unknown quantities; radicals; involution and evolution; square and cube root; logarithms; ratio and proportion; exponents, including fractional and negative.

### Plane Geometry

As much plane geometry as is included in any of the generally accepted text books. The student should be familiar with properties of plane rectilinear figures, the measurement of angles, the circle, polygons, etc. He should be able to make applications to the measurement of lines and plane figures.

### Arithmetic

Definitions; elementary, operations in addition, subtraction, multiplication and division; squares; cubes; square root; interest, discount; fractions, simple and complex; decimals; percentage, alligation; ratio and proportion. Metric System.



STEAM ENGINE UNIT — ENGINE ROOM

## English

Applicants must show familiarity with the following books:

Shakespeare's *The Merchant of Venice*; Sir Roger de Coverley Papers in the *Spectator*; Irving's *Life of Goldsmith*; Coleridge's *The Ancient Mariner*; Scott's *Ivanhoe* and Lowell's *The Vision of Sir Launfal*; George Eliot's *Silas Marner*; Burke's *Speech on Conciliation with America*.

Subjects for a theme will be taken from the above mentioned books and the candidate will be expected to answer questions concerning the lives of the authors and principal historical events associated with the books. The composition will be judged from its correctness in spelling, punctuation, grammar, idiom and paragraphing. The candidate will be judged by how well he writes rather than how much he writes. He will also be expected to correct samples of bad English, for spelling, punctuation, capitalization, grammar and construction.

## Geography

Location of principal countries, with capitals, large rivers, mountains, etc., noting characteristics of climate, productions and inhabitants. General statements rather than specialization are sought.

## American History

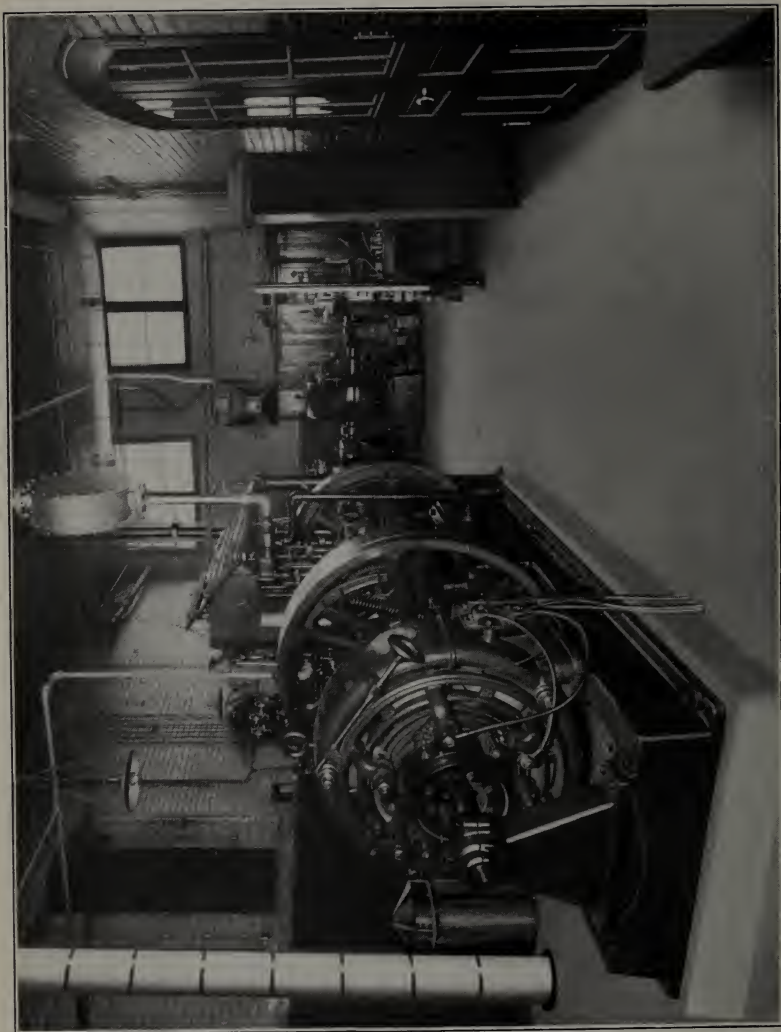
Applicants must show familiarity with the early settlements in America, the colonies, their government, the customs of the people and events which led to the establishment of the United States. They should be informed concerning the causes and effects of the principal wars in which the country has been involved. Applicants should be prepared to consider questions involving a knowledge of Civil Government as well as historical facts, connected with the growth of this country up to the present time.

## Preparation

Particular stress is laid upon a thorough grounding in mathematics including Algebra, Arithmetic and Plane Geometry, as these form the basis upon which the work of this school rests. A preliminary course in science, including Physics and Chemistry serve to prepare the student's mind for the higher branches of these subjects and their application.

## Advanced Standing

Candidates who may have received previous training in any of the subjects ordinarily taken in the regular course may present themselves for examination as per calendar. If a satisfactory rank be attained, they will be given such further work as will be best suited to their advancement.



GAS ENGINE UNIT — ENGINE ROOM

### **Attendance Card**

At the beginning of each term all students must fill out and file with the Principal on blank forms which are provided, a formal application for such subjects as are required in his course and for which he is sufficiently prepared, subject to the approval of the Principal. When an attendance card is once approved, no change can be made except through the Principal.

### **Application Blanks**

A blank form of application for admission may be found at the end of this bulletin. This should be properly filled out by all applicants whether entering upon certificate from a preparatory school or presenting themselves for examinations.

### **Fees**

The fee for the day course is \$100 per year for residents of Massachusetts, with the exception of the Chemistry and Dyeing Course, for which the fee is \$125. This applies only to students entering September, 1907 and thereafter. For non-residents the fee for all courses is \$150 per year.

By vote of the Trustees in July, 1907, the tuition for all foreign students making application and entering after September, 1907, shall be \$300 a year.

Three-fifths of the fee is charged for a single term and is payable on or before October 10, the balance on or before February 10, of each year. Students attending but one term will be charged three-fifths of the yearly fee. After payment is made, no fee or part thereof can be returned, except by special action of the Trustees.

Special students pay, in general, the full fee, but if a course be taken involving attendance at the school during a limited time, application may be made to the Principal for a reduction.

Students must provide their own books, stationery, tools, etc., and pay for any breakage or damage that they cause. The above fee includes free admission for any day student desiring to attend any of the evening classes in which there is accommodation.

For all first year students a minimum deposit of \$20 is required to cover the cost of breakage in the chemical laboratory, the unexpended balance to be returned to the student at the end of the year.

For all students in second or third year taking work in Chemistry or Dyeing Laboratories a deposit of \$15 per term is required. The unexpended balance will be returned at end of year.

The fees for the evening classes are indicated under Evening Classes for which see page 31.



Fees are strictly payable in advance, and students whose fees remain unpaid after the above mentioned dates will not be admitted to classes.

All deposits must be made before students can be admitted for laboratory work.

### **Aid to Students**

Free scholarships have not been provided for but provision will be made for applicants for the day courses who have the qualifications for matriculation and are properly vouched for, who furnish satisfactory evidence that they are unable at entrance to meet the charges in whole or in part for tuition.

### **Examinations**

Examinations are held at the end of each term.

In general, the examinations cover the work of the preceding term, but at the end of the third year, candidates for diplomas may be examined on all of the preceding three years' work.

Examinations for students conditioned in first term subjects are held in May and examinations for students conditioned in the Final Examinations are held in September following.

If a student fails to clear a condition he may be required to repeat or drop the subject; and he cannot be admitted to subjects dependent thereon.

Intermediate examinations are held every five weeks and these serve to inform the student concerning his standing and the progress made.

Daily work and regularity of attendance are considered in making up the reports of standing.

Continued or persistent absence (or tardiness) from the classes is considered reason to exclude a student from the class.

### **Reports of Standing**

Twice during each term informal reports are sent to students, or to guardians of such as are not of age; and at the end of each term formal reports are made.

### **Thesis**

All candidates for the diploma of the school must file with the Principal not later than May 15, a report of original investigation, or research, written on a good quality of paper, 8x10 inches, with one inch margin at left, and 1-2 inch at right of each page; such thesis to have been previously approved by the head of the department in which it is made.



## **Graduate Course**

Graduates of technical courses of other schools are invited to communicate with the Principal with reference to special courses in the textile studies. Previous training in the engineering branches will usually reduce materially the time necessary to complete any of the courses at this school. The advantages offered to such persons for special research work are unexcelled, and a most profitable course may be arranged.

## **The Regular Courses**

The title of each of the regular courses is an indication of the particular nature of the course, unless it be in the case of Course III. There is a considerable demand for a general textile course in which the whole subject may be treated broadly, and this course is organized with this particular object in view. Certain general studies are included in each course, in order that in specializing, a too narrow view may be avoided.

## **Special Courses**

While it is always urged that regular courses be followed as far as possible, there is opportunity to take any of the subjects taught for which the student is prepared, providing the schedule will permit. All students contemplating a special course should consult with the principal.

## **Special Awards of Merit**

For the past two years a friend of the school has offered prizes in the form of books to be awarded to the successful candidates on graduation day. These prizes are continued this year with slight modifications from preceding years. The conditions in detail are as follows:

First:—Ten dollars to the student taking the regular Chemistry and Dyeing course in the Lowell Textile School, who shall be considered as having attained the highest scholarship in First Year Chemistry.

Second:—Five dollars to the student taking the regular Chemistry and Dyeing course in the Lowell Textile School, who shall be considered as having attained the second highest scholarship in First Year Chemistry.

Third:—Ten dollars to the regular student of the Chemistry and Dyeing course who shall be considered as having attained the highest scholarship during his second year.

Fourth:—Five dollars to the regular student of the Chemistry and Dyeing course who shall be considered as having attained the second highest scholarship during his second year.

Fifth:—Ten dollars to the regular Chemistry and Dyeing student of either the second or third year class who shall write the best article upon one of five subjects to be specified by the instructing staff of the Chemistry and Dyeing Department.

Sixth:—Twenty dollars to the regular student in the Chemistry and Dyeing course who shall present the best Thesis preparatory to graduation.

The above mentioned sums are to be invested in books which may be selected after graduation. In case no one is considered as being worthy of any particular scholarship prize the same may be withheld. The decision in such case shall rest with the judges.

### **Diploma**

The diploma of the School is awarded upon the satisfactory completion of any one of the regular courses, covering not less than three years, except where entrance is to advanced standing. In such cases at least one year's attendance is required.

### **Medal of Honor**

The National Cotton Manufacturers' Association offers annually a medal to that member of the graduating class from the Cotton Manufacturing course, selected because of his standing and general ability, as best fitted to receive it.

### **Attendance**

Day students are expected to attend all lectures, classes and demonstrations of practical work, except when permission to be absent has been obtained from the Head of the Department. In cases of sickness or other unavoidable absence, written explanation must be sent to the Principal. The daily work of the student forms an important part of his record, and no student will be awarded the diploma unless this portion of his record is clear.

### **Conduct**

Books are prescribed for study, for entry of lecture notes and other exercises, and are periodically examined by the lecturers. The care and accuracy with which these books are kept are considered in determining standing.

Students are required to return to the proper place all instruments or apparatus used in experimental work and to leave all machinery and apparatus with which they may experiment clean and in working order.

All breakages, accidents, or irregularities of any kind must be reported immediately to the head of the department, or instructor in charge.

In cases of either day or evening students, irregular attendance, lack of punctuality, neglect of either school or home work, disorderly or ungentlemanly conduct or general insubordination, are considered good and sufficient reason for the immediate suspension of a student, and a report to the Trustees for such action as they deem necessary to take.

It is the aim of the Trustees so to administer the discipline of the school as to maintain a high standard of integrity and a scrupulous regard for trust. The attempt of any student to present as his own, work which he has not performed, or to pass any examination by improper means, is regarded by the Trustees as a most serious offense and renders the offender liable to immediate suspension or expulsion. The aiding or abetting of a student in any dishonesty is also held to be a grave breach of discipline.

Any student who violates these provisions will be immediately suspended by the Principal and the case reported at the following meeting of the Trustees for action.

Young men abounding in vitality when suddenly cut loose from home and established social environment to acquire an education at a residential school need especially the careful direction of more mature minds in the formation of new associations. The managements of all residential schools are aware that this fact is the cause of considerable anxiety on the part of parents and guardians. The responsibility thus placed upon those under whose care these pupils are committed is profoundly recognized.

The public schools are for boys and girls, the college for youth, the higher technical and professional schools of medicine, law, engineering, etc., are for men. It is now fully recognized that the fundamental idea of the general educational system, from the kindergarten to the college inclusive, should be the development and establishment of character, and it is therefore expected that those entering the technical schools will have made some progress in self-respect, self-denial and self-control. They enter substantially upon their life work when they matriculate at the higher technical schools and may be placed on their honor as to conduct and not be subject to an irritating and humiliating system of espionage outside of school hours.

In place of such espionage it is the policy of technical schools to rely mainly upon the discipline of the work of the course in connection with ample facilities for physical exercise in the various athletic games and sports, for which ample provision has been made at this school.

Pupils often err in conduct from thoughtlessness and lack of experience rather than through wilfulness, and unconsciously fall into habits because of the lack of intelligent warning and instruction. For this reason, it is proposed to give thorough instruction by lectures, covering the subjects of hygiene, the preservation of physical vigor, morals, thrift, the

duties of citizenship, etc. A careful scrutiny will also be maintained by the instruction staff in order to detect in the students any tendency of relaxation in the work or attendance, and all reasonable effort will be made to maintain a high standard of scholarship and morals.

### **Library**

The school library is supplied with leading textile books and with works dealing with science, art or industries allied to the textile trades. The leading textile papers are kept on file.

### **Sessions**

The regular school sessions are in general from 8.30 a. m. to 12.30 p. m., and from 2 to 4.30 p. m., except Saturdays, when the buildings are closed in the afternoon.

A tabular view designates the hours at which the various classes meet. This is rigidly adhered to and the student is marked for his attendance and work as therewith scheduled.

### **General**

Students from a distance, requiring rooms and board in the city, may if they desire it, select the same from a list which is kept at the School. The cost of rooms and board in a good district is from \$6 per week upwards.

All raw stock and yarn provided by the School, and all the productions of the School remain, or become, the property of the Trustees, except by special arrangement, but each student is allowed to retain specimens of yarn or fabrics that he has produced, if mounted and tabulated in accordance with the requirements of the school. It is understood that the Trustees may retain in the School such specimens of student's work as they may determine.

Apparatus used in the Dyeing or Chemical Laboratory is provided by the School, but a deposit must be made by the student at the beginning of the term sufficient to cover its cost, and this deposit will be returned to him at the close of the term, subject to such deduction as will reimburse the School for broken or damaged articles and material used.

Lockers are provided for the use of students, sufficiently capacious to contain clothing, books and tools. A deposit of 25 cents is required, which will be returned to the student upon surrender of the locker key.

No books, instruments, or other property of the School are loaned to the students, to be removed from the premises except by special permission.

## Materials

Students must purchase such tools, instruments, text books, and apparatus as may from time to time be recommended by the head of each department, and the cost of these for day students is from \$15 to \$20, and for evening students from \$1 upwards according to the subject studied.

## Awards

Gold Medal, Paris Exposition, 1900, for general excellence. A special Medal, Merchants and Manufacturers Exposition, Boston, 1900. The Pan American Medal awarded to the School, 1901. Gold Medal, Louisiana Purchase Exposition, 1904, Gold Medal, Lewis and Clark Centennial Exposition, 1905.

## Bulletins and Catalogue

All students registering and paying the regular fee for the course selected are entitled to the Bulletins and Catalogues when issued.

Special bulletins descriptive of the Chemistry and Dyeing Course, the Wool Manufacturing Course, the Cotton Manufacturing Course and the Designing Course, have been prepared and may be obtained upon application.

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## COURSES OF INSTRUCTION

In the column headed "Hours of Exercise" the numbers represent for each particular subject the total hours required for a period of fifteen weeks.

For detail description of the subjects taught see pages 86-113.

### FIRST YEAR

#### FIRST TERM

*(Common to all courses)*

(Common to all courses)		Hours of Exercise
Elements of Mechanism		45
Mechanical Drawing		112
Mathematics,—Algebra		30
Hand Loom Weaving and Elements of Design		55
General Chemistry		187
Decorative Art	}	15
Freehand Drawing		
English		15
German		20

## COURSE 1. — COTTON MANUFACTURING

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The Cotton Manufacturing Course is designed for students contemplating a career in the manufacturing of cotton yarns and cloths or allied industries.

During the first term of the first year, the studies are common to all courses and include instruction in elementary mechanism, mathematics, mechanical drawing, general chemistry and decorative art. Laboratory work supplements the lectures in chemistry and hand loom weaving assists in illustrating the principles of textile design.

The work in the Cotton Yarn Department comprises instruction in all the processes from the bale to the finished yarn. The instruction consists of lectures upon the machines and processes, and laboratory work upon the machines themselves. In the laboratory each student is required to make exhaustive tests upon each machine and all the settings and adjustments possible. The third year's work in this department is largely devoted to lectures upon the manufacture of specialties, waste products, etc., and special laboratory work, special tests upon yarns and fabrics, mill planning with regard to the arrangement of machinery and other work of an advanced nature.

The course in chemistry consists of lecture and laboratory work on inorganic chemistry followed by instruction in textile chemistry and dyeing, including a short course in the dyeing laboratory.

The work in mechanism is followed by steam engineering, electricity, hydraulics and mill engineering. The mechanical drawing taken in connection with these subjects augments this instruction as well as provides opportunity for students to become skilled in draughting.

The course in designing, cloth analysis, and cloth construction includes lectures on plain and fancy weaves and Jacquard work, the analysis of all commercial fabrics, and designs for the same. During the third year of this course students in this department specialize on cotton fabrics.

Power weaving is taken up during the second and third years. Commencing with lectures and practice upon plain looms, the student is taken through dobby and box-loom weaving to Jacquards.

A course in knitting taken during the third year includes the manufacture of hosiery and underwear. There is also a course of lectures on the finishing of cotton fabrics.

For detail description of the subjects see page 86.



## COURSE I. — COTTON MANUFACTURING

### FIRST YEAR

*For First Term see page 75.*

#### SECOND TERM

	Hours of Exercise		Hours of Exercise
Cotton Carding and Drawing	127	Textile Chemistry	15
Textile Design, Cloth Analysis	60	Freehand Drawing and Decorative	
Hand Loom Weaving	55	Art	15
Elements of Mechanism	60	Mechanical Drawing	67
Mathematics—Trigonometry	30	German	20
Elementary Organic Chemistry	30	English	15

### SECOND YEAR

#### FIRST TERM

Cotton Spinning	240	Mechanical Engineering	30
Textile Design, Cloth Analysis	67	Power Loom Weaving	30
Textile Chemistry and Dyeing	30	Physics	30
Machine Drawing	40	Industrial History	15
Weaving Mechanism	15		

#### SECOND TERM

Cotton Spinning	142	Electrical Engineering	30
Textile Design, Cloth Analysis	60	Power Loom Weaving	82
Textile Chemistry and Dyeing	82	Machine Drawing	40
Mechanical Engineering	30	Physics	15
Weaving Mechanism	15	Industrial History	15

### THIRD YEAR

#### FIRST TERM

Cotton Yarn Manufacture	195	Knitting Machinery	30
Textile Design	30	Power Loom Weaving	135
Cloth Analysis and Hand Looms	60	Mill Engineering	30
		Electrical Engineering	15

#### SECOND TERM

Cotton Yarn Manufacture	212	Mill Engineering	45
Textile Design, Cloth Analysis	60	Knitting Machinery	30
Power Loom Weaving	142	Physical Laboratory	20
Thesis			

## COURSE II. — WOOL MANUFACTURING

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The course of Wool Manufacturing is arranged for those who contemplate a career in the manufacture of woollen or worsted fabrics. It includes instruction in all of the varied processes employed in adapting the wool fibre to cloth, namely,—sorting, scouring, carding, combing, spinning, designing, weaving, dyeing and finishing. The work is carried on by lectures, recitations and practical work in the laboratories.

Following the first term, which is common to all courses, the student in his second term commences work in the Woollen and Worsted Laboratory, and through systematic steps is acquainted with the machines employed in the first steps of yarn manufacturing. At the same time lectures are given upon the many kinds of wool, variation in quality, grades, uses, etc., as influenced by the locality where grown. This is followed by practical work on the sorting table.

The second and third years cover spinning of woollen yarn and worsted yarn by the Bradford and French systems, also the manufacture of tops, including combing, gilling and back washing. Scouring and carbonizing are taken up in detail by lectures and by practical work.

The general chemistry of the first year leads to organic chemistry, followed by textile chemistry and dyeing in the second year. This includes a short course in the Dyeing Laboratory.

Textile designing, cloth analysis and construction are continued from the first year throughout the course, the work being applied especially to woollen and worsted goods. Weaving on power looms commences in the second year and continues through the third.

Lectures on finishing commence with the third year and are augmented by extensive practice with the machines in the Finishing Department.

Work in the Mechanical Department extends throughout all three years and includes mechanical drawing, properties of saturated steam, electricity and hydraulics. The practical application of the principles studied in these subjects is brought out forcibly in the work on mill engineering, where mill design and construction are considered. A short course covering methods employed in the testing of fibres, yarns and cloths, together with laboratory work in the manipulation of certain physical apparatus, is given in the second and third years.

For detail description of the subjects see page 91.

## COURSE II. — WOOL MANUFACTURING

### FIRST YEAR

*For First Term see page 75.*

#### SECOND TERM

	Hours of Exercise		Hours of Exercise
Woolen Carding and Spinning	127	Textile Chemistry	15
Textile Design, Cloth Analysis	60	Freehand Drawing and Decorative	
Hand Loom Weaving	55	Art	15
Elements of Mechanism	45	Mechanical Drawing	67
Mathematics—Trigonometry	30	German	20
Elementary Organic Chemistry	30	English	15

### SECOND YEAR

#### FIRST TERM

Wool Sorting, Scouring and		Weaving Mechanism	15
Woolen Spinning	240	Mechanical Engineering	30
Textile Design, Cloth Analysis	67	Power Loom Weaving	30
Textile Chemistry and Dyeing	30	Physics	30
Machine Drawing	40	Industrial History	15

#### SECOND TERM

Wool Sorting, Worsted Carding,		Electrical Engineering	30
Combing and Spinning	142	Power Loom Weaving	82
Textile Design, Cloth Analysis	60	Machine Drawing	40
Textile Chemistry and Dyeing	82	Physics	15
Mechanical Engineering	30	Industrial History	15
Weaving Mechanism	15		

### THIRD YEAR

#### FIRST TERM

Wool Sorting, Worsted Spinning,		Power Loom Weaving	135
English and French Systems	120	Finishing	75
Textile Design	30	Mill Engineering	30
Cloth Analysis and Hand Looms	60	Knitting	60

#### SECOND TERM

Wool Sorting, Worsted Spinning,		Finishing	75
English and French Systems	145	Mill Engineering	45
Textile Design, Cloth Analysis	60	Physical Laboratory	20
Power Loom Weaving	135	Knitting	30
Thesis			

### COURSE III. — TEXTILE DESIGN

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The general course in Textile Design is planned to meet the demand of young men for a technical training in the general processes of textile manufacturing, but with particular reference to the design and construction of fabrics. To this end a foundation is laid in the first year by instruction in mechanics, mechanical drawing, mathematics, chemistry and the elementary principles of designing and weaving. The student is required to pursue a course in the yarn departments, both cotton and wool. By this method he acquires a knowledge of the manufacture of cotton yarns from the bale to the yarn and of woolen and worsted yarns from the fleece.

Throughout his entire course he receives instruction in design, cloth analysis and construction of all the standard cloths, viz.—trouserings, coatings, suitings, blankets, velvets, corduroys, plushes, etc. This leads into advanced work in Jacquard designing, being supplemented by work in the studio of the Decorative Art Department.

The course in chemistry leads to textile chemistry and dyeing in the second year and includes a short course in the dyeing laboratory.

Power weaving commences with the second year and continues throughout the course.

During the third year the student receives instruction in the Finishing of Woolen and Worsted cloths. This instruction is given by means of lectures and laboratory work.

The instruction in the Mechanical Department is carried along parallel with the other subjects of the course and includes steam, electricity and hydraulics. In the third year mill engineering is taken up and serves to show the application of the principles studied in the previous years. Mechanical drawing extends throughout all three years and finds extensive application in the machine departments.

For detailed description of the subjects see page 95.

# COURSE III. — TEXTILE DESIGN

## FIRST YEAR

*For First Term see page 75.*

### SECOND TERM

	Hours of Exercise		Hours of Exercise
Textile Design, Cloth Analysis	128	Mathematics—Trigonometry	30
Hand Loom Weaving	55	Textile Chemistry	15
Elements of Mechanism	60	Mechanical Drawing	67
Elementary Organic Chemistry	30	Cotton Yarn Manufacture	60
Freehand Drawing and Decorative Art	15	German	20
		English	15

## SECOND YEAR

### FIRST TERM

Textile Design, Cloth Analysis	135	Decorative Art	40
Machine Drawing	40	Power Loom Weaving	30
Textile Chemistry and Dyeing	30	Cotton Yarn Manufacture	130
Mechanical Engineering	30	Physics	30
Weaving Mechanism	15	Industrial History	15

### SECOND TERM

Textile Design, Cloth Analysis	104	Woolen Spinning	90
Mechanical Engineering	30	Machine Drawing	40
Textile Chemistry and Dyeing	82	Power Loom Weaving	45
Industrial History	15	Physics	15
Weaving Mechanism	15	Decorative Art	45
Electrical Engineering	30		

## THIRD YEAR

### FIRST TERM

Textile Design, Cloth Analysis	90	Mill Engineering	30
Hand Loom Weaving	30	Finishing	75
Power Loom Weaving	135	Decorative Art	40
Worsted Spinning	82	Electrical Engineering	15

### SECOND TERM

Textile Design, Cloth Analysis	110	Mill Engineering	45
Power Loom Weaving	142	Finishing	75
Decorative Art	40	Physical Laboratory	20
Thesis		Worsted Spinning	75

#### COURSE IV. — CHEMISTRY AND DYEING

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The regular course in Chemistry and Dyeing is especially recommended to those who intend to enter upon any branch of textile coloring, bleaching, or the manufacture or sale of the various dyestuffs and chemicals used in the textile industry. The theory and practice of all branches of dyeing, printing, bleaching, scouring, etc., are taught by lecture work supplemented with a large amount of laboratory work.

During the first year general chemistry, including both inorganic and organic, is taught by lectures and laboratory work, and this is supplemented during the second term by qualitative analysis and stoichiometry. The lectures upon textile chemistry also begin during the first year.

Advanced inorganic as well as advanced organic chemistry are studied throughout the second year as a continuation of the elementary chemistry of the first year, but the majority of the time is spent upon quantitative analysis, industrial chemistry and textile chemistry and dyeing.

The third year is devoted to advanced textile chemistry and dyeing, dye testing, dye matching, woolen and worsted finishing, calico printing and cotton finishing, quantitative analysis, industrial chemistry, physical chemistry and thesis work.

The work is taken up in a thorough manner and has been so arranged that the amount of time spent in the laboratories and in class-room work balance each other. Sufficient studies are taken in the other departments to broaden the knowledge of the student in regard to textile work in general, and he is given such training as the time will permit in mathematics, mechanical drawing, modern languages and designing.

The student who conscientiously performs all of the prescribed laboratory work and the practice work should be proficient not only in dyeing and textile printing, but should be well trained in the methods of analysis and the testing of the various chemicals, mordants and dyestuffs so extensively used in the textile industry.

For detail description of subjects see page 98.



# COURSE IV. — CHEMISTRY AND DYEING

## FIRST YEAR

*For First Term see page 75.*

### SECOND TERM

	Hours of Exercise		Hours of Exercise
Elementary Organic Chemistry	30	Mathematics—Trigonometry	30
Textile Chemistry	15	Mechanical Drawing	30
Stoichiometry	30	Decorative Art	15
Qualitative Analysis	236	German	20
Cloth Analysis	30	English	15
Elements of Mechanism	60		

## SECOND YEAR

### FIRST TERM

Advanced Organic Chemistry	15	Heat, Steam Engineering	30
Advanced Inorganic Chemistry	30	Quantitative Analysis	112
Industrial Chemistry	120	Power Loom Weaving	30
Textile Chemistry and Dyeing	30	Physics	30
Dyeing Laboratory	90	Industrial History	15

### OPTIONS

Designing	Advanced Mathematics
Power Loom Weaving	

### SECOND TERM

Advanced Organic Chemistry	30	Heat, Steam Engineering	10
Advanced Inorganic Chemistry	30	Dyeing Laboratory	217
Textile Chemistry and Dyeing	15	Electricity	30
Quantitative Analysis	127	Industrial History	15
Physico-Chem. Measurements	15		

## THIRD YEAR

### FIRST TERM

Industrial Chemistry	68	Physical Chemistry	30
Advanced Textile Chemistry and Dyeing	30	Quantitative Analysis	135
Dyeing Laboratory	157	Finishing	45

### SECOND TERM

Industrial Chemistry	30	Quantitative Analysis	98
Physical Chemistry	30	Woolen and Worsted Finishing	60
Advanced Textile Chemistry and Dyeing	20	Calico Printing and Cotton Finishing	60
Dye Testing and Color Matching	60	Thesis	150

## COURSE VI. — TEXTILE ENGINEERING

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The course in Textile Engineering is planned to train the student to meet intelligently the engineering problems of the textile industry as well as to provide him with the essentials of the processes and machines in the varied branches of this industry.

The student is first thoroughly grounded in the broad fundamental principles of science and mathematics underlying all engineering work and textile manufacturing with its many closely allied industries. The most important of the preliminary subjects are mathematics, physics, mechanics and mechanism, and mechanical drawing. The work in mechanism and drawing is particularly thorough and the practical uses of these subjects are considered of first importance. The study of physics while taking up the usual branches included in this subject is given with special reference to problems involved in the physical testing of fibres, yarns and fabrics, etc. The student is required to spend a portion of his time during the course upon the subjects of cotton yarns, woolen and worsted yarns, and power weaving with practical work in each branch. During his first year he has a brief course in the elements of design, and in his second year he pursues a course in textile chemistry and dyeing which is preceded in the first year by the necessary preliminary course in elementary, organic and inorganic chemistry. Special importance is attached to the study of power generation, transmission, and measurement and courses with laboratory practice are given in the elements of steam, electrical and hydraulic engineering, to familiarize the student with the means, methods and results available in the modern practice of these branches.

The recently equipped engineering laboratory together with the extensive power plant of the school affords opportunities for a varied line of experimental work including boiler, engine and pump tests. Systematic instruction in the most approved methods of machine shop practice is provided in the shop which is fully equipped with the best makes of modern tools. This feature of the course is considered a most valuable adjunct to the training of a textile engineer.

The work in mill engineering covers a wide range of subjects including mill construction with calculations and drawings, mill heating, lighting, fire protection, electric driving, etc. The arrangement of plants and machinery for the most economical power distribution and efficient "organization" is also taken up in detail, data for problems being taken from actual cases and the solutions compared with those of some of our best known mill engineers.

For detail description of subjects see page 109.

## COURSE VI.—TEXTILE ENGINEERING

### FIRST YEAR

*For First Term see page 75.*

#### SECOND TERM

	Hours of Exercise		Hours of Exercise
Mathematics—Trigonometry	30	Designing (Elements)	60
Machine Drawing	135	Hand Loom Weaving	55
Freehand Drawing	15	Cotton Yarn Manufacture	60
Elements of Mechanism	60	Gearing	15
Elementary Organic Chemistry	30	German	20
Textile Chemistry	15	English	15

### SECOND YEAR

#### FIRST TERM

Advanced Mechanism	15	Mechanical Laboratory	45
Analytical Geometry	30	Electricity	30
Machine Drawing	75	Cotton Yarn Manufacture	120
Steam Engineering	30	Physics	30
Power Loom Weaving	30	Industrial History	15
Weaving Mechanism	15	Machine Shop	45
Textile Chemistry and Dyeing	30		

#### SECOND TERM

Analytical Geometry	30	Mechanical Laboratory	30
Machine Drawing	75	Electricity	45
Steam and Hydraulics	45	Woolen Spinning	90
Physical Laboratory	45	Applied Mechanics	15
Power Loom Weaving	30	Industrial History	15
Weaving Mechanism	15	Textile Chemistry and Dyeing	15
Machine Shop	45		

### THIRD YEAR

#### FIRST TERM

Worsted Spinning	120	Mill Engineering	45
Differential, Integral Calculus	30	Power Plants	30
Mill Engineering Drawing	90	Applied Electricity	30
Physical Laboratory	45	Machine Shop	45
Finishing	30		

#### SECOND TERM

Worsted Spinning	120	Mill Engineering Drawing	90
Differential, Integral Calculus	30	Physical Laboratory	45
Mill Engineering	45	Power Plants	30
Machine Shop	45	Electrical Laboratory	45
Finishing	30	Thesis	

# OUTLINE OF INSTRUCTION

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## COTTON DEPARTMENT

### *Cotton Fiber*

- Development of Cotton Spinning Machinery.
- Botanical Varieties—Their Classification and Characteristics.
- Commercial Varieties—Classifications, Characteristics and Adaptatives.
- Microscopical Examination of Various Cottons.
- Points Considered in judging Cotton—Dampness, Color, Uniformity, etc.
- Grading and Stapling—American, Egyptian and Sea Island Cottons.
- Methods of Cultivation and Marketing.
- Ginning—Construction, Operation and Advantages of Saw and Roller Gins.
- Baling—Various forms of Baling Presses and their Products, Characteristics of each.
- Mixing—Object and Methods of Mixing for Per cent., Grade, Variety and Color Mixtures.
- Classification of the Processes of Yarn Manufacture.

### *Opening and Picking*

- Construction and Operation of various machines used in opening and picking cotton, Hopper Bale Breaker, Opener, Automatic Feeder, Breaker, Intermediate and Finisher Pickers, Waste Openers and Cleaning Machines.
- Details of Construction—Cleaning Trunks, Evener Motions, Types of Beaters, Grids and Screens, Lap Measuring Motion, Safety Stop Motion.
- Details of Operation—Regulation of the Air Current, Character and Regulation of the Waste, Drafts of Intermediate and Finisher.
- Adjustment of Feeder, Grid Bars, Lap Racks and Feed Rolls.
- Causes of and Remedies for—Uneven laps, Split laps, Ragged selvages, Dirty laps, etc.
- Cleaning and Oiling.

### *Carding*

- Object and Principles of Carding.
- Construction and Operation of Revolving Flat, Wellman, Foss & Peevey and Roller and Clearer Cards.
- Details of Construction—Feed Plate and Roll, Screens, Flats, Doffer, Combs, Coiler, Mote-knife, etc.

Card Clothing—Various forms of Foundation, Wire, Method of Setting, Number of Points per square foot, Shape and Size of Wire, Methods of Grinding, Method of Cutting Tape and Clothing Cylinder, Doffer and Flats.

Details of Operation—Method of driving various parts, Stripping, Grinding and Burnishing, Setting of various parts, Draft, Speeds and Production, Temperature and Humidity.

Care of Carding Machinery, defects in quality of work and remedies for same.

Character and Regulation of waste.

Sample Carding by hand of at least twelve different blends.

### *Drawing*

Theory of Drawing.

Effect of the Doublings.

Construction and Operation of the Drawing Frame.

Details of Stop Motions, Mechanical and Electrical and advantages of each.

Details of Drawing Rolls, Solid and Shell, Common and Metallic.

Metallic Rolls—Construction, Operation and Advantages.

Roll Covering—Materials used, Roller Cloth, Selection of leather for various kinds of work, Methods of applying leather covering.

Roller Varnish—Its object and methods of applying, recipes for same.

Roll weighting for Common and Metallic Rolls.

Setting of Drawing Rolls for Long and Short Staple, Heavy and Light Slivers, etc.

Minor Details—Clearers, Traverse Motion, Weight Relieving Motion, Trumpets and Condensing.

Amount and proportioning of drafts and tension.

Construction and Operation of Railway Head.

Details of Evener Motion, Stop Motions, etc.

Care of Drawing Machinery, Roller scouring, Cleaning and Oiling, Sizing of sliver, cut sliver and remedies for same.

### *Roving Processes*

Reeling, Weighing and Numbering of Roving by English and Metric Systems.

The Development of the Fly Frame.

Details of Construction of Slubber, Intermediate, Fine and Jack Fly Frames.

Details of the regulation of Draft, Twist, Lay and Tension on fly frames.

Amount of Twist for various cottons and methods of obtaining same.

Builder Motions—English and American types and method of setting and adjusting.

Proportioning and amounts of draft and roller setting.  
Creeling, Piecing, Doffing, Cleaning and Oiling.  
Stop Motions—Full bobbin, Safety stop, Back stop motion, Single Roving Stop Motion.  
Details of Winding and the Regulation of the Tension.  
Study of the Differential Motion and its work in the Fly Frame.  
Study of the Functions and Development of the Fly Frame Cones.  
Defects in adjustment and product of roving machinery and remedies for same.

### *Ring Spinning and Twisting*

Theory of Spinning.  
Classification of yarns in regard to uses, Materials, Varieties and Twist.  
Reeling, Weighing and Numbering of single and ply yarns.  
Construction and Operation of the Ring Frame.  
Consideration of Spinning details, thread guides, separators, traveller cleaners, warp and filling bobbins, space of spindles, drum and bands, roving traverse, etc.  
Rolls and roll setting, weighting, single and double boss, amount and proportioning of draft for various yarns.  
Twist and twist gearing, Amounts for warp, filling and hosiery yarns, ply yarns, etc.  
Rings and Travellers, Kinds and methods of determining correct size for various yarns.  
Comparison of Single and Double Roving in Spinning.  
A Study of the development of the modern Spindle.  
The Spinning Builder—Study of the Warp Filling and Combination Builder Mechanisms.  
Calculations for Speed, Draft, Twist, etc.  
Methods of preparing yarn for Twisting.  
The Spooler and Multiple Winder.  
Operation of Ring and Flyer Twisters.  
A Study of the Wet and Dry Twisting Processes.  
Care of the rolls, spindles, bands, doffing.  
Uneven, cut and cockled yarns and remedies for same.

### *Combing*

Object of Combing.  
Kinds of cotton combed and classes of goods requiring combed yarns.  
Preparing cotton for Combing, Drawing frame, Sliver lapper, Ribbon Machine.  
Combinations of preparatory machines and details of operation.



- A study of the Heilmann Comber and its operation, Feed Motion, Nippers, Cylinders, Detaching Mechanisms, Draw-box, Draft, Waste and Production, Single and Double Nip Machines.
- Setting and Timing the Comber, Regulation of Waste and Production, Weight of lap, etc.
- A Study of the Alsation Comber and its Operation.
- A Study of the Nasmith Comber and its Operation.
- Care and management of Combing Machinery.

### *Mule Spinning*

- A Comparison of Throstle, Ring and Mule Spinning and the Products of each Machine.
- Advantages and Disadvantages of each machine.
- Construction and Operation of the Self Acting Mule.
- Details of Operation, Drawing and Twisting, Backing off, Winding, Re-engaging.
- Details of Construction, Builder Motion, Quadrant, Roller Motion, Nosing Motions, Jacking Motions, etc.
- A Study of Building and Winding.
- Calculation of Draft, Twist, Drag, Production.
- Causes of and remedies for, Kinky yarn, Soft cops, Ridgy cops, Uneven chase, etc.

### *Organization*

- Methods of handling Cotton Waste, Details of the manufacture of Cotton Wadding and other Waste Products.
- Details of Fine Yarn Spinning, the manufacture of Sewing Thread, Lace Yarns, Twines and Cords.
- The Manufacture of Fancy Yarns, Nub, Soop, Splash, Spiral Yarns, Flake Yarns, etc.
- Factory Organization for various sizes and styles of yarns, Equipment, Programs, Balance of Production, Cost of Machinery, Power, etc.
- The Economic Arrangement of Cotton Machinery.
- Life of Cotton Machinery, Depreciation and Valuations.
- Factory Cost Systems, Inventory, Productive and Non-Productive Labor, Supplies, Maintenance, General Expenses, etc.

### **Knitting**

The course in Knitting is designed to meet the needs of those requiring special work in this branch, as well as those desiring only a general knowledge of the subject and is given to Third Year students of courses I, II and VI. The course begins with lectures upon the yarns used and the preliminary operations, and continues with the construction and operation of the various makes of knitting machines as applied to circular and flat knitting.

Beginning with the hand stocking frame, the student is given instruction upon the machines used for hosiery and the flat machines used in the manufacture of gloves, sweaters and jackets.

Following is a list of subjects taken up:

- Knitting Yarns and Their Manufacture.
- Operations preliminary to Knitting.
- Winding—Cone Winding, The Payne Winder.
- Development of Knitting.
- Knitting Needles—Their Construction and Operation.
- Latch Needles, Spring Needles.
- Method of Producing Standard Stitches.
- Study of the Plain, Rib and Tuck Stitches and their uses.
- Circular and Flat Knitting Machines.
- Operations involved in the Manufacture of Seamless Hosiery.
- Study of the Production of the Rib Top.
- Details of Construction and Operation of the Circular Rib Knitting Machine, including a consideration of Stop Motions, Needle Cams, Pattern Wheels, Splicing Attachments, Measuring Devices, etc.
- Transferring of Rib Tops.
- Details of Construction and Operation of the Seamless Hosiery Machine, including a study of Stop Motions, Plaiting Attachments, Pattern Wheels and Chains, Shaping the Heel and Toe, Reinforcing the Heel and Toe, Loosening the Stitch for Reinforcing and Shaping, Semi, Three-quarter and Full Automatic Hosiery Machines.
- Construction of the Looper and Study of its Operation, Regulation of Tension, etc.
- Designing on Seamless Hosiery Machines—Study of the Production of Fancy Stitches, Designing by Means of Colored Threads.
- Size of Yarn for Various Work and Gauges.
- Study of the Finishing of Hosiery—Washing, Dyeing, Boarding, Mending, Pressing, Pairing, Stamping, etc.
- Imperfections in Circular Knit Goods and Remedies for Same—Dropped Stitches, Curled Work, Ragged Edges, Stains, Streaked Work, etc.
- A Study of the Flat Knitting Machines—The Lamb Principle as applied to Glove and Sweater Manufacture.
- The Jacquard as applied to Flat Knitting Machinery.

## WOOLEN AND WORSTED DEPARTMENT

### *Raw Materials*

Animal Fibres—Wool, Silk, Mohair, Alpaca, Vicuna, Cashmere, Camel Hair, etc.  
Vegetable Fibres—Cotton, Flax, Hemp, Jute, Ramie.  
Wool Substitutes—Noil, Shoddy, Mungo, Extracts.  
Waste Products manufactured on Woolen Machinery—Cotton Waste, Linters, Flax, Hemp, and Jute Waste.  
Sources of supply and relative values of above.  
Chemical and Physical properties and Composition.  
Microscopical examination.

### *Wool Fibre*

Physical and chemical structure—Differences between wool, hair and fur—  
Physical properties, Strength, Elasticity, Curl, Lustre, etc.  
Felting Property—Hygroscopic Property.  
Structure and cause of Kemps.  
Definitions of trade terms—Picklock, XXX, XX, 1-2 Blood, 3-8 Blood, 1-4 Blood, Delaine, Braid, etc.  
Pulled Wools—Their uses and classification.

### *Wool Sorting*

Difference between Sorting and Grading—Sorting and Blending.  
Judging Spinning Qualities.  
Estimating Shrinkage.  
Definitions of trade terms—Cots, Hog, Shurled Hogget, Wether, Fribs, Paint, Stain, Shoulder, Cast, etc.

### *Wool Scouring.*

Object of Wool Scouring.  
Composition of Yolk and Suint.  
Cholesterol and Lanolin.  
Materials used as detergents.  
Emulsion Process—Use of Soda, Potash, Hard and Soft Soaps.  
Manufacture of Scouring Soaps with tests for impurities.  
Water in Wool Scouring with tests for hardness, etc.  
Effect of heat on Wool Fibre with proper heat of scouring liquor.  
Recovery of potash salts and wool fat from waste scouring liquor.  
The Solvent process—Degreasing Wool, with Naphtha.  
Construction and use of Scouring Machines and Rinse Boxes with  
Speeds, Adjustments and Productions.

Construction and use of Dryers, Table and Artificial.  
Effect of heat on Lustre; proper heat for various classes of Wool—  
(Braid, Botany, Mohair, etc.).

### *Carbonizing*

Object of Carbonizing.  
Carbonizing Wool, Noils, Burr Waste, Rags, etc.  
Carbonizing Agents—Sulphuric Acid, Aluminum, Chloride, etc.  
Hydrometers.  
Strength of Carbonizing Agents.  
Carbonizing with Acid Gases.  
Neutralizing.

### *Burr Picking*

Object of Burr Picking—What wools are Burr Picked and why they  
are not carbonized.  
Construction and Use of the several Kinds of Burr Pickers.  
Adjustments, Speeds and Production of same.

### *Mixing and Oiling*

Object of Mixing. Laying down lots.  
Mixing Different colors of Wool.  
Mixing Wool with Cotton, Shoddy, Noils, etc.  
Object of Oiling—Discussion of various Kinds of Oils used, Olive,  
Lard, etc.  
Oil Testing, Viscosity, Flashing Point, etc.  
Manufacture of Emulsions.  
Construction and Use of Automatic Oilers, Feeds and Pickers.  
Speeds, Productions and Calculations for cost of Lots when materials  
of different values are used.

### *Carding*

Principles of Carding.  
Functions of various parts—Feed Rolls, Lickerins, Tumblers, Work-  
ers, Strippers, Cylinders, Fancies, Dickies, Doffers, etc.  
Construction of various parts.  
Direction of Revolution and Speeds.  
Card Clothing—Construction and uses of the various Kinds of Back-  
ing: Leather, Flexifort, etc.—The several Kinds of Wire—Gar-  
nett, Metallic, Convex, Lickerin, etc.  
The "Counts and Crown" method of counting Card Clothing.  
Card Adjusting and the use of Card Sets.  
Clothing the Card.  
Card Grinding and Grinders, Solid Roll, Traverse, Screw and Chain.

### *Woolen Cards*

Construction and use of the First Breaker, Second Breaker and Finisher.

Various methods of coupling Cards.

Card with Breast.

Woolen Card Feeds—Object, Construction, and use of Automatic Feeds for First Breaker, Bramwell, etc.

The Construction and use of the several Kinds of Automatic Feeds for Second Breaker and Finisher, Apperly, Torrance Balling Head and Creel, Bates, Kemp, Scotch, etc.

Condensers, Rub Roll, Combination, Double Apron, etc.

Calculations for Proper Weight of Rovings, Speeds, Productions, etc.

SAMPLE CARDING.—Each student is required to make at least twenty Sample Mixes combining different colors and grades of Stock and to Felt and Mount the same. Part of the Carding to be done by Hand Cards and part on the Torrance Sample Mixing Card.

### *Woolen Mule*

Principles of Spinning. History and development.

Hand Jack, Self-operating and Self-acting Mules. The Mule-head.

Methods of Driving the various parts, Rolls, Spindles, Carriages, etc. Backing-off. Winding Mechanism.

Study of the Quadrant and Builder-rail. Regulation of the Fallers.

Double Spinning. Twisting on Mule and on Woolen Twister.

With the above lectures will be given all the necessary calculations and actual practice on the various machines.

## **Worsted**

### *Top Making*

CARDING AND PREPARING—The principles of Worsted Carding—Types of Worsted Cards, Double Cylinder Lickerin, Breast, etc.

Speeds, Settings, Feeds, Adjustments, Productions.

PREPARING—Differences between Carding and Preparing—What Wools are Prepared and why they are not Carded. The use of Emulsions. A Set of Preparers. The calculations for Drafts on any Gill Box. The Clough Gill Box.

The proper Drafts in Preparing—Adjustments, Speeds, Productions, Calculations, etc.

GILLING AFTER CARDING—Number of Doublings, etc.

### *Combing*

The principles, history and development of Worsted Combing.

Combing on the Noble and Lister machines.

Calculations for Draft—Settings, Speeds, Productions, etc.

Per cents. of Noil.

GILLING AFTER COMBING—Proper Drafts and calculations for Doublings.

BACK WASHING—The object and nature of the process—Backwashing Liquors, Composition, Heat, etc.

The Hygroscopic property of Wool—Conditioning of Tops—Top Mixing.

#### *Open Drawing or Bradford System*

The Principles of Drawing. Numbers of Operations for different Counts of yarn. The use of Logarithms in Drawing Calculations, Study of the Drag—Calculations for Drafts and Twists—Proper Ratch.

The functions of the Weigh Box.

Measuring Stop Motions, Candle Stick, Side Knock-off, etc.

Calculations for length.

Construction and use of Gauge Points or Constants.

Effects of Doubling.

The Dram and Hank Systems for numbering Roving.

#### *Cone Drawing*

The object and use of Cone Drawing—Differential Motions, Builder Motions—Calculations for Draft—Twist-Tension and Lay—Adjustment, Speeds and Productions.

#### *French Drawing*

The principles and use of French Drawing—Functions of the Porcupine. The principle of Condensing—Manufacturing of Merino Yarns.

#### *Spinning, Open or Bradford System*

The Principles of Spinning. Calculations for Draft and Twist—Spinning on the Cap—Flyer and Ring Frames—The Scaife Builder Motion—Drag in Bradford System of Spinning—The use of Straight, Conical and Bell Mouthed Caps. Top Roll, Single and Double Covered, Iron and Wood.

Types of Frames, Leicester and Illingworth; Speeds, Productions, etc.

#### *Spinning, French System.*

Principles of Worsted Mule Spinning, Calculations for Draft and Twist, Ratch, Drag, Backing off, Winding, Re-engaging, Size and shape of Caps, Builder Motion, Quadrant, Metric and English systems of Calculations.



## *Twisting*

Principles of Twisting, Reeling, Weighing and Numbering of Single and Ply Yarns, Twisting on Cap, Flyer and Ring Frames—Calculations for Twist—Twist testing—Trap Twisters—Effect of direction of Twist; Speeds, Productions, Yarn Testing, etc.

The true difference between Woolen and Worsted Yarns. Layout of Machinery for different classes of Yarns—Power required for different machines—Cost of Machinery and approximate labor cost of each Department, Sorting, Scouring, Carbonizing, Picking, Carding, Combing, Drawing, Spinning, Twisting, etc., for various classes of Yarns, Carpet, Braid, Botany, etc.

## DESIGNING AND POWER WEAVING DEPARTMENT

### Textile Design

This course is taken by students of all manufacturing courses throughout the entire three years. Students of Courses IV and VI pursue the subject during the first year only. The instruction takes up the subjects of Classification of fabrics, use of point or design paper, plain fabrics, intersection, twills and their derivation, sateen, basket and rib weaves, checks and stripes, fancy weaves including figured and colored effects; producing chain and draw from design and vice versa; extending and extracting weaves.

The work of the second year follows with consideration of fancy and reverse twills, diaper work, damasks, skip weaves, sateen fabrics with plain ground, backed fabrics, and multiple ply fabrics. Students are required to make original designs and reproduction of analyzed samples and put the same into the loom. Special attention is given to the consideration of color effects.

The advanced work of the third year takes up the more complicated weaves adapted to harness work and leads into leno and Jacquard designs. The following is a brief list of the subject heads which will give some idea of the course: Double plain cloths, Ingrains, Tricots, Chinchilla, Tapesstry, Blankets, Upholsteries, Spot weaves, Pile or Plush, Crepon, Matelasse and its imitation, Pique, Marseilles, Quilting, Miscellaneous designs for Jacquard, Lenos, Fustian, Tissue fabrics, Lappets, etc.

The same plan is pursued during this year as in the second year, that of requiring the students to make original designs and to weave the same.

## **Fabric Analysis**

This subject is taken by all courses during the first year, and is continued during the second and third years by Courses I, II, and III. It takes up in a systematic manner the analysis of samples illustrating the various cloth constructions for the purpose of determining the design of the weave, the amount and kind of yarns used and forms the basis of calculation in the cost of reproducing any style of goods. The various headings discussed are, Reeds and Setts, Relation and determination of counts of cotton, woolen, worsted, silk, and yarns made from the great variety of vegetable fibres. Grading of yarns, folded, ply, novelty and fancy yarns. Application of the metric system to yarn calculation. Problems involving the use of both English and Metric systems. Problems involving take-up and shrinkage, average counts, determination of counts of yarn, weight of yarn required to produce a given fabric, determining diameters of yarns. Methods of testing yarns. Question involving loom productions, mixes, blends, etc.

## **Practical Work**

In connection with the above outlined work practical work is carried on upon the hand looms and upon the power looms. This includes the preparation of warps, beaming, dressing, sizing, drawing-in and making of chains, the cutting and lacing of cards. Spooling and quilling and the machinery for the same. A study is made of warpers, sizing machines both for cotton and woolen. Lectures are given properly timed to correspond with the progress of the student in the Power Weave laboratory covering the following subjects:

Loom adjustments, chain building, shuttle changing looms, dobby looms, single and double acting dobbies, handkerchief motions, leno weaving, centre selvedge motions, filling changing looms, oscillating reeds, lappet motions, various shaker motions, towel and other pile cloth weaving. Jacquard looms, single and double lift leno Jacquards, Jacquards of special design, tying up Jacquard harness. The consideration of the mechanical operation and design of the special mechanisms and the calculations involved is taken up by the Engineering Department in a course of weaving mechanism for which see page 109.

## **Textile Costs**

There has recently been organized a course of lectures and class work for the purpose of giving instruction upon the systems of determining the costs of producing textile yarns and fabrics, as well as the value of the materials at various stages in the process of manufacture. It is not the plan of this course to teach one particular system of cost finding to the

exclusion of all others but rather to give the general fundamental principles applicable in any system, to show the interrelationship of the various departments and the duties of the various officers. The list of the headings under which the instruction is given will give some idea of the ground covered.

Requirements in a cost system.

Comparison of new and old methods.

Organization of a mill and the relationship of the departments.

Administrative, Manufacturing, Commercial Divisions.

Distribution of expenses.

Depreciation.

Labor and its subdivisions: Day work—Piece work, etc. Premium labor, Differential labor.

Details in processes in manufacturing influencing costs.

Inventories.

Numbering or lettering processes applied to cost systems.

Material tables.

Time cards.

Weekly department cards.

Use of charts in showing comparison of costs.

Wastes, leaks.

Problems are frequently given for the purpose of illustration and to assist in fixing the principles involved clearly in mind.

## DECORATIVE ART DEPARTMENT

### FIRST YEAR

All students attend lectures and class-work throughout the year. The first term is devoted to a study of letters and lettering. Classic forms are taken as a standard and are studied and drawn in detail and in composition. Later both modern decorative and engineer's letters are given due attention.

Second term. Realizing the importance of color in textile manufacture this subject is given careful consideration. The course includes study of color scales, nomenclature, color matching, simultaneous contrast of color, individual qualities of color, influence of contiguous areas, mixture of color by juxtaposition, color harmony, and study and practice in eastern and western systems of coloring and design.

### SECOND AND THIRD YEARS

This work is for designers only and includes a detail study of the decorative fabrics of historic periods. The course includes lectures upon the fabrics and class-work. Original designs are made and colored for each of the periods studied and their outlines suggested on point paper.

## CHEMISTRY AND DYEING DEPARTMENT

### Elementary Chemistry

This subject is required not only of the students taking the regular course in Chemistry and Dyeing, but by all others intending to take a complete course and receive the school diploma.

It extends through one entire year and includes lectures, recitations, and a large amount of individual laboratory work upon the following subjects:

#### *Chemical Philosophy*

Chemical action, chemical combination, combining weights, atomic weights, chemical equations, acids, bases, salts, Avogadro's law, molecular weights, formulas, valence, periodic law, etc.

#### *Non-Metallic Elements*

Study of their occurrence, properties, preparation, chemical compounds, etc.

#### *Metallic Elements*

Study of their occurrence, properties, metallurgy, chemical compounds, etc.

#### *The Hydrocarbons and their Derivatives*

Study of their occurrence, properties, preparation, uses, etc. This work although elementary in character is of sufficient breadth to prepare the student understandingly for the work with the artificial dyestuffs which follows.

#### *Qualitative Analysis*

Before the completion of the course, the student takes up as thoroughly as the time will permit, the qualitative detection of the more common metals and non-metals, with practical work.

### Qualitative Analysis

Qualitative Analysis is studied by all regular students in Course IV during the second term of the first year. The work is based upon Prescott and Johnson's *Qualitative Chemical Analysis* and consists of one lecture, one recitation, and not less than twelve hours laboratory work per week. The student must become familiar with the separations and the detections of the common metals and acids by the analysis of a satisfactory number of solutions, salts, alloys, pigments, etc. At intervals during the term, short laboratory tests are given as well as the regular written examinations.

No pains are spared to make the course as valuable to the student as possible and to encourage only thorough and intelligent work.

When sufficiently advanced, students take up the examination of various products with which the textile chemist must be familiar, such as testing mordanted cloths, pigments, and the various dyeing reagents.

During the latter part of this course a certain amount of time is devoted to the preliminary operations of Quantitative Analysis, such as the precipitation and washing of such substances as barium sulphate, magnesium ammonium phosphate, calcium oxalate, etc., although no weighings or actual determinations are made.

A student's marks in this subject depend as much upon the neatness and care used in manipulation as upon the actual results obtained.

### **Stoichiometry**

This subject is taken up by the Chemistry and Dyeing student during the second half of the first year.

The application of the metric system is thoroughly studied, and problems are worked involving the expansion and contraction of gases, determination of empirical formulae, combining volume of gases, quantitative analysis, etc.

### **Advanced Inorganic Chemistry**

The whole subject of Inorganic Chemistry is reviewed during the second year, and many advanced topics are introduced which were necessarily omitted from the first year course in General Chemistry.

### **Advanced Organic Chemistry**

The course consists of lectures and recitations extending through the second year. The principles of organic substitution and synthesis are thoroughly discussed using as many illustrations as the time will permit, particularly such as are applied in the arts. The alliphatic series of hydrocarbons and their derivatives are studied for about twenty weeks of the year, the remainder of the time being devoted to the benzene series. The aim of the course is to lay a broad foundation for the chemistry of the artificial dyestuffs, which is studied in the third year. Students are required to work out problems in the synthesis of various compounds in order to get familiarized with equation writing.

### **Physical Chemistry**

This subject is studied during the third year.

It includes the principles of calorimetry, specific heat, vapor density, the various methods of determining molecular weights, laws of solution, electrolytic dissociation, theories of precipitation, thermo-chemistry, surface tension, etc. The student is required to work out a large number of problems introduced by the subject.



## Quantitative Analysis

This subject is taken up by all regular Chemistry and Dyeing students, and extends through the second and third years of the course.

During the second year, the principles of analytical work are thoroughly taught, the work being based on Talbot's Quantitative Chemical Analysis. Gravimetric analysis is studied during the first term, and volumetric analysis during the second term. The samples analyzed include salts, ores, minerals, bleaching powder and alkalies. Frequent recitations are held for the discussion of methods and the solution of stoichiometrical problems. Students are encouraged to read the standard works and magazines on chemical subjects, in order to cultivate broad views of the science.

The third year work involves chiefly technical analysis, the principal consideration being the analysis of water, alum, ammonia, soaps, coal, indigo, tannin, and the ultimate analysis of organic compounds, as well as the examination of acids, alkalis, oils, scouring materials and such substances as starches, gums, and other thickeners, detection of adulterants, etc.

No pains are spared to give the students the benefits of all the latest researches along the lines of industrial analytical methods, and original work is encouraged in all.

## Textile Chemistry and Dyeing

Under this head is included first, the lecture course in Textile Chemistry and Dyeing, which is taken by all regular diploma students; second, the general laboratory course taken by all regular diploma students, except those taking Course IV, and the laboratory and practical work course which is taken by the regular Chemistry and Dyeing students.

### OUTLINE OF LECTURE COURSE

#### *Technology of Vegetable Fibres*

Cotton, Linen, Jute, Hemp, China Grass, etc. Chemical and physical properties, chemical composition, microscopical study, and their action with chemicals, acids, alkalies, heat, etc.

#### *Technology of Animal Fibres*

Wool, Mohair, Silk, etc. Chemical and physical properties, chemical composition, microscopical study, and their action with chemicals, acids, alkalies, heat, etc.

#### *Technology of Artificial Fibres*

Study of the various forms of artificial silk, the process of manufacture, their properties and action with chemicals, acids, heat, etc.



### *Operations Preliminary to Dyeing*

Bleaching of cotton and linen, wool scouring, bleaching, fulling and felting of wool, carbonizing, silk scouring and bleaching, action of soap.

The bleaching of cotton cloth, yarn and raw stock is studied at length with detailed descriptions of the various forms of kiers and machinery used; also the action of the chemicals used upon the material and the various precautions that must be taken in order to insure successful work.

Under this heading is also included an exhaustive study of the reagents used in emulsive wool scouring process and their action upon the fiber under various conditions; also the most successful of the solvent methods for degreasing wool.

### *Water and its Application in the Textile Industry*

Impurities present, methods for detection, their effect during the different operations of bleaching, scouring, dyeing and printing, and the methods for their removal or correction.

The important subject of boiler waters is also studied under this heading with a full discussion of the formation of boiler scale, its disastrous results and the methods by which it may be prevented.

### *Mordants and Other Chemical Compounds used in Textile Coloring not Classified as Dyestuffs*

Theory of mordants, their chemical properties and their application, aluminum mordants, iron mordants, tin mordants, chromium mordants, organic mordants, tannin materials, soluble oil, fixing agents, levelling agents, assistants, and numerous other compounds not dyestuffs that are extensively used in the textile industry.

Under this heading is included the definitions of various terms and classes of compounds, used by textile colorists, such as color lakes, pigments, fixing agents, developing agents, mordanting assistants, mordanting principles, levelling agents, etc.

### *Theory of Dyeing*

A discussion of the chemical, mechanical, solution and absorption theories, and the various views that have been advanced by different investigators of the chemistry and physics of textile coloring processes.

Under this heading is discussed the general methods of classifying dyestuffs and definitions of such terms as textile coloring, dyeing, textile printing, substantive and adjective dyestuffs, monogenetic and polygenetic dyestuffs, etc.

### *Natural Coloring Matters*

Organic, properties, an application of indigo, logwood, catechu or cutch, Brazil wood, cochineal, fustic, tumeric, madder, quercitron bark, Persian berries, and other natural dyestuffs that have been used within recent years by textile colorists.

### *Mineral Coloring Matters*

Under this heading is discussed the properties of such inorganic coloring matters and pigments as chrome yellow, orange and green, Prussian blue, manganese brown, iron buff, etc.

### *Artificial Coloring Matters*

General discussion of their history, nature, source, methods of manufacture, methods of classification, and their application to all fibers.

Special study of:—

Basic Coloring Matters.

Phthalic Anhydride Colors, including the eosins, phloxines, etc.

Acid Dyestuffs.

Janus Colors.

Direct Cotton Colors.

Sulphur Colors.

Mordant Colors, including the alizarines and other artificial coloring matters requiring metallic mordants.

Mordant Acid-Colors.

Insoluble Azo Colors, developed on the fiber.

Reduction Vat Colors, including Artificial Indigo, Indanthrene, Flavanthrene, Viridanthrene and Melanthrene.

Aniline Black and other artificial dyestuffs not coming under the above heads.

As each class of dyestuffs is taken up, the detail of the methods of applying them upon all the different classes of fabrics and in all the different forms of dyeing machines are thoroughly discussed; also the difficulties which may arise in their application, and the methods adopted for overcoming them.

### *Machinery used in Dyeing*

A certain amount of time is devoted to the description of the machinery used in the various processes of textile coloring, which is supplemented as far as possible by the use of charts, diagrams, lantern slides, etc.

Most of the important types of dyeing machines are installed within the dyehouse of the School and the students can be taken directly from the lecture room and shown the machines in actual operation.

## Outline of Laboratory and Practical Work

Besides lectures and recitations upon this subject, those taking the regular day course in Chemistry and Dyeing are required to do at least fifteen hours per week of practical laboratory work. By the performance of careful and systematic experiments the student learns the nature of the various dyestuffs and mordants, their coloring properties, their action under various circumstances and the conditions under which they give the best results. The more representative dyestuffs of each class are applied to cotton, wool and silk, and each student is obliged to enter in an especially arranged sample book, a specimen of each of his dye trials with full particulars as to the conditions of experiment, percentage of compounds used, time, temperature of dye bath, etc.

For convenience and economy most of the dye trials are made upon small skins or swatches of the required material, but from time to time students are required to dye larger quantities, in the full sized dyeing machines which are described elsewhere.

By the use of a small printing machine the principles of calico printing are illustrated, and by means of the full sized dyeing machines, vats, etc., the practical side of the subject is studied. It is the constant endeavor of those in charge, to impart such information of a theoretical and scientific character as will be of value in the operation of a dyehouse.

## Advanced Textile Chemistry and Dyeing

This is a continuation of the Textile Chemistry and Dyeing of the second year and includes a review of the second year's work in this subject, with the introduction of many advanced considerations, and in addition the following subjects:—

### *Classification and Construction of Artificial Dyestuffs*

A study from a more advanced standpoint of the classification and constitution of artificial dyestuffs, including the various methods used in their production, also the orientation of the various groups which are characteristic of these compounds, and their effect on the tinctorial power of dyestuffs.

The object of this study is to give the student a more complete knowledge of the artificial dyestuffs from the color manufacturer's point of view, and it will prove of particular value to those who intend later to enter the employ of dyestuff manufacturers or dealers.

This subject cannot be taken by students who have not completed the second year course in Organic Chemistry.

### *Color Matching and Color Combining*

A study of that portion of physics which deals with color, and of the many color phenomena of interest to the textile colorist, the lec-

ture work being supplemented with the practical application of the spectroscope and tintometer, are much practice in the matching of dyed samples of textile material.

The primary colors both of the scientist and textile colorist and the results of combining colored lights and colored pigments, and such subjects as color perception, color contrast, purity of color, luminosity, hue, color blindness, dichroism, fluorescence, and the effect of different kinds upon dyed fabrics are discussed under this heading.

Each student's eyes are tested for color blindness early in the course in order that he may be given an opportunity to change his course if his eyes should prove defective enough to interfere with his work as a textile colorist.

A dark room has been provided where various experiments in color work and color matching may be performed.

### *Dye Testing*

This subject includes the testing of several dyestuffs of each class, to all the common color destroying agencies, the determination of their characteristic properties and their action towards the different fibers. Also the determination of the actual money value and coloring power of dyestuffs in terms of a known standard.

Each student is required to make a record of each color tested upon an especially prepared card which furnishes a permanent record of the dyestuff, its dyeing properties, fastness to light and weather, washing, soaping, fulling, perspiration, bleaching, steaming, ironing, rubbing, acids and alkalis.

### *Union Dyeing*

A study of the principles involved in the dyeing of cotton and wool, cotton and silk, and silk and wool union materials with the production of solid and two color effects.

### *Textile Printing*

A thorough study of the whole subject of textile printing, each student being required to individually produce no less than twenty different prints including the following styles:— Pigment style, direct printing style, steam style with tannin mordant, steam style with metallic mordant, madder or dyed style, the ingrain or developed azo style, discharge dyed style, discharge mordanted style, resist style, indigo printing, aniline black printing.

The different parts of the calico printing machine are thoroughly studied, the precautions which must be considered in its use and the arrangement of the dyeing apparatus which must accompany such a machine.

Special attention is paid to the methods of mixing and preparing the various color printing pastes that are used in the above work upon the manufacturing scale as well as experimentally in the laboratory.

### *Cotton Finishing*

A study of the various processes of finishing cotton cloth, and the different materials used therein. The work involves the discussion of the various objects of cotton finishing and such operations as pasting, damping, calendering, stretching, stiffening and filling, and the various machines used for carrying out these processes.

### *Mill Visits*

During the third year, visits are made to some of the large dyehouses, bleacheries and printworks in the vicinity.

## **Industrial Chemistry**

Special attention has been given to this subject, because it is considered extremely important in the study of chemistry in general, and of textile chemistry in particular. During the second year considerable time is spent in the laboratory in the actual manufacture, from raw materials, of the chemical compounds used in textile work. Each student is required to make careful record of all of the crude materials used, as starting points, and to carry the various processes through as carefully as possible with the view of producing as great and pure a yield of each substance as possible. Industrial Chemistry not only involves the application of the principles of both inorganic and organic chemistry, but of analytical work as well, for the purity of the compounds produced must be tested after their manufacture.

In addition to the general work in this subject, each student is required to make a special study of the manufacture of some chemical from raw materials in considerable quantity (20 to 25 pounds) making a complete quantitative analysis of all the raw materials used and of the finished product, accounting for everything throughout the process with the object of producing as near the theoretical yield as possible. The student is charged with amount of raw materials at market prices, and the finished product is bought back by the school.

During the past year extensive construction work and much new apparatus has been added to the industrial chemistry laboratory and it is now believed to be one of the most complete of its kind. The present equipment allows of a comparatively large quantity of materials being handled at one time.

During the whole of the third year, lectures and recitations are held in Industrial Chemistry, the course in general following "Thorpe's Outline of Industrial Chemistry." Particular attention is paid to those subjects



which are of special interest to the textile chemist, as oils, soaps, gas and coal tar industry, building materials and the manufacture on a large scale of important chemical compounds, such as the common acids and alkalies, bleaching powder, various mordants, etc. The course is illustrated as far as possible with specimens, diagrams and charts, and the students are given an opportunity to visit some of the industrial establishments in the vicinity of Lowell and Boston.

### Microscopy

The value of the microscope in the detection and examination of the various fibres cannot be over-estimated, and often facts may be discovered, and conclusions drawn, which could be arrived at in no other way.

The students in this course are given as much work with the microscope as time will permit. They receive instruction in the use of the high grade microscopes, and not only have practice in the examination and detection of the fibres, but are required to become proficient in the preparation of permanent slides.

Opportunity is also given for students to take microphotographs of fibres and the various slides which they may prepare. A special dark room has been provided for this purpose.

## FINISHING DEPARTMENT

### *Burling and Mending*

Examination of flannel from loom.

Perches; construction; location regarding light, etc.

Marking defects, measuring, weighing and numbering.

Methods of inspection; fancies; single cloths; double cloths, etc.

Object of burling and mending.

Various types of burling tables.

Usual method of removing; knots; runners, etc.

Object of back shearing; back burling.

Burling and specking irons.

Replacing missing threads, etc.

Importance of sewing on various fabrics.

Removal of oil and tar spots, etc.

### *Fulling*

Object.

Condition of flannel from the loom; oil, size, etc.

Early methods of producing a felt.

Construction of various types of stocks; hammer falling, crank stocks, etc.

Construction and object of the kicking mill.



Various types of rotary fulling mills; single and double, etc.  
 Details of construction of; main rolls, wooden and composition; methods of covering; regulation of pressure, adjustment, etc.  
 The trap; methods of regulating trap pressure; shoes, wooden and bronze.  
 Stop motion; various types; object; method of regulating.  
 Various types of; stretchers; guide rolls; throat plates, etc.  
 Theory of; felting; pressure; moisture; heat.  
 Felting and hygroscopic properties of various woolen fibres.  
 Action of; alkali; acid; heat (moist and dry).  
 Drafts; single; double; triple.  
 Preparation of flannel for the mill; tacking selvages; sewing ends.  
 Various methods of measuring shrinkages.  
 Application of soap; soaping machine; direct application in the mill; tests for moisture; over and under soaping.  
 Preparation of soaps for fulling and scouring purposes; body and strength, etc.  
 Value of various soaps for fulling; tallow; palm oil; red oil, etc.  
 Tests for impurities.  
 Determination of proper strength for fulling and scouring various goods; alkalies.  
 Action of soap in the fulling mill; saponification process; lubrication of fibres, etc.  
 Regulation of warp and filling shrinkages.  
 Cover required for various finishes.  
 Theory of handling various classes of goods in the mill; all wool; shoddies; mixed goods.

#### *Estimation of finishing shrinkages*

Loss of flocks during various operations; fulling; gigging; shearing, etc.  
 Flocking; various methods; dry; wet; combination.  
 Preparation of the flocks; sorting; grinding, etc.  
 Mill wrinkles; spots; rolling selvages; cockles; cloudy and tender goods, etc.

#### *Washing and Speck Dyeing*

Object.  
 Rinsing.  
 Scouring.  
 Construction of various types of washers; rotary; continuous; open width; hosiery washers.  
 Details of construction; main rolls; suds-box; guides, etc.  
 Theory of scouring.  
 Scouring various classes of goods before and after fulling.

The use of; Fuller's earth; salt solutions; sours, etc.  
Defects caused by improper scouring; stains; cloudy effects; wrinkles;  
unclean goods, etc.  
Object of speck dyeing.  
Methods of preparation; materials used; testing.  
Various methods of application.

### *Carbonizing Flannel*

Object.  
Carbonizing agents.  
Hydrometers.  
Strengths of solutions.  
Drying and dry milling.  
Neutralizing; various methods.  
Stains developed during carbonizing.  
Hydro-extractors; various types; details of construction.  
Construction of various types of drying and tentering machinery.

### *Gigging, Napping and Steaming*

Object.  
Method of treating various classes and grades of flannels.  
Construction of various types of gigs, nappers, steamers.  
Construction and object of rolling and stretching machines.  
Teasels, growth; setting, etc.  
Cropping.  
Straightening.  
Wet gigging, etc.  
Various methods of steam finishing.  
Lustre, etc.  
Crabbing; object.  
Construction of crabs.  
• Methods in general use.  
Cooling, etc.  
Singeing; gas; plate.  
Construction of various types.  
Methods of water-proofing.  
Apparatus in general use.

### *Brushing, Shearing, Pressing, etc.*

Steam brushing; object.  
Various types of machines.  
Steaming; moisture; lustre, etc.  
Shearing; object.  
Various types and details of construction.  
Grinding.  
Setting of shears, etc.

Various types of plate and rotary presses.  
Details of construction.  
Pressure.  
Steaming, etc.  
Discussion of various machines for special purposes; construction; object, etc.  
Methods of finishing all classes and grades of woolen and worsted fabrics.  
Object of sponging.  
Various methods.  
Destruction of lustre.  
Spotted and shrinking.  
London shrunk; cold water process; hydraulic pressing.  
Cloth examining; measuring; weighing; ticketing; numbering; rolling, etc.  
Allowance for defects, etc.  
Necessary calculations are given in connection with the above.

## **TEXTILE ENGINEERING DEPARTMENT**

### **Elements of Mechanic and Mechanism.**

This course occupies ninety hours of lectures and recitations, covering the whole of the first year, and is required by all courses. Great stress is laid upon the fundamental principles of these subjects and the applications are considered with special reference to their use in textile machinery. Both analytical and graphical treatments are used in the solution of the numerous problems which are carefully selected with the view of giving proper preparation for the student's later work in spinning and weaving. The numerous applications of mechanism met in textile machinery, including many of the higher forms such as epicyclic trains and other compound motions, make this course a most essential one. During the second term a short time is devoted to a consideration of the principles of applied mechanics, including strength of materials. Students in course VI also take fifteen additional hours on gearing.

### **Mechanism of Power Weaving.**

This course consists of thirty lectures covering both terms of the second year and is required by all the regular students taking power weaving. A thorough analysis of all the important motions of power weaving is undertaken and the treatment is by graphical and analytical methods. The object of this course is to so familiarize the student with the theory of the mechanism of the loom that the time spent in the weave room on loom fixing is used to the best advantage.

### **Mechanical Drawing.**

This course is taken by all regular students in the first term of the first year. The weekly program consists of one lecture and five hours in the drawing room. The work covered in this term includes the use of the drawing instruments; geometrical constructions, elements of descriptive geometry, shadows, isometric projection; development, tracing and sketching practice. It is considered of the utmost importance that the student shall appreciate the practical usefulness of this subject as early as possible.

### **Machine Drawing.**

This work is a continuation of the mechanical drawing and includes seven hours per week during the second term of the first year. Practical sketching from machine details, working scale detail and assembled drawings and blue print process are included in this course. Students in Course VI being assigned additional time in the drafting room are enabled in many cases to complete a full set of the detailed drawings for an entire machine.

During the second year all regular students except Course IV spend  $2\frac{1}{2}$  hours per week on a series of advanced graphical mechanism problems. These problems are in all cases taken directly from textile machines that the students meet in other departments and include cam designs for builder motions, mule scroll layouts, Scaife builder motion, Fly Frame cones, quadrant motion and a number of others of similar character.

### **Mathematics.**

The subject of advanced algebra is taken up by the first year students during the first term. In this course consisting of lectures, class and problem work, are the subjects of, Theory of Exponents, Quadratic Equation, Ratio and Proportion, Variation, Arithmetical, Geometrical and Harmonical Progression, Undetermined Coefficients, Binomial Theorem, Permutation and Combination, Graphical Representation and Solution of Equations. This subject is taken by all courses.

The subject of Plane Trigonometry follows the advanced algebra in the last part of the first term and is completed during the second term. Several exercises at the end of this course are devoted to instruction and practice in the use of the slide-rule. The above course is required of all First year students.

### **Analytical Geometry.**

This course consists of sixty exercises given during the second year to students of Course VI. The instruction is given by lectures and class work and considers the subject heads of Loci, straight line, Common sys-

tem of Co-ordinates. Transformation of Co-ordinates, the Circle, Conic Section, Parabola, Hyperbola and Ellipse; these are considered with reference to both Polar and Rectangular Co-ordinates.

### **Differential and Integral Calculus.**

This subject is taken by all Course VI students and extends throughout the third year. It is arranged with the aim to give the students a working knowledge of the subject and to present its application in the many problems of Engineering.

### **Electrical Engineering.**

This subject is conducted with the object of giving the students of all courses a general knowledge of the fundamental principles of electricity and magnetism together with their applications as they occur in the textile industry. The course commences with the second term of the second year and continues into the third year.

The instruction is given by means of lectures, recitations, and laboratory work and includes the subjects of Elementary electricity, Magnetism, Electrical Units, Measuring instruments, Direct current machinery, Generators, Motors, Switch board design, System of Transmitting power by electricity, Electric lighting, storage batteries, Electrolysis, etc. Following this is a discussion of alternating current Phenomena, A. C. Generators, Motors, and other apparatus required in the generation and distribution of power by electricity.

Students of Course VI pursue this subject to a greater extent and carry on considerable laboratory work in conjunction with the lectures and recitations.

### **Physics.**

The course of General Physics is required of all second year regular students. The instruction is given by means of lectures and laboratory work and includes the following subjects:—The Laws of falling bodies, Mass, Density, Momentum, Mechanics, Elementary Principles of Hydrostatics, Sound, which includes a study of the means of propagating and determining velocity of sound, Interference of Sound Waves, Reflection and Refraction of Sound, etc. Considerable time is devoted to the subject of Light in accordance with the modern theory concerning its propagation, measurements of velocity, analysis and interference. The application of laws of mirrors, lenses and prisms as found in the microscope, spectroscope, etc., and consideration of the physical laws underlying color and color effects receive special attention.

Laboratory work is given during the second and third years with the purpose of familiarizing the student with the apparatus available for

making general physical measurements as well as special apparatus used in testing textile materials. Particular attention is given to the method of making observations and the treatment and interpretation of the data so obtained.

### **Shop Practice**

Systematic instruction is given in the most approved methods of machine shop practice, the object being to familiarize the student with the proper use of tools and the characteristics of the different materials worked. Particular attention is given to the form, setting, grinding, and tempering of tools, and the mechanism of the different machines involving cutting speeds, feeds, etc. The course is so planned that the instruction in each typical operation shall conform as nearly as possible to commercial practice. The list of equipment given elsewhere in this catalog indicates the scope of this work. Instruction is also given in the use of wood working tools, both hand and machine and also in forging.

### **Steam Engineering**

A course of forty-five lectures is given during the second year and is required by all regular students. The principal phenomena of heat finding application in the development of power are first studied thoroughly. This is followed by the subjects of boilers, engines, turbines, condensers, pumps, and other important features of a steam plant. The lectures pertain mainly to the principles, proper operation and performance of these units, while a standard text book supplies the matter descriptive of the different types and the construction details.

A few lectures are also devoted to a study of the modern gas engine and its applications.

In addition to the above, students in Course VI are given fifteen additional lectures going more fully into the thermodynamic principles underlying the subjects as well as laboratory tests. (See Engineering Laboratory)

### **Hydraulics**

A course of fifteen lectures covering the principles of hydraulics including hydrostatics, measurements of flow of water through orifices, pipes, nozzles and over weirs. The different types of turbines are studied with results of tests and rating tables.

### **Engineering Laboratory**

This work is taken only by the students in the Textile Engineering Course during both terms of the second year. The following list of tests indicate the character of the work which is carried on in the engineering laboratory and power plant:



Efficiency tests of chain block, jack screws, wedges, etc.  
Calibration and use of differential dynamometer.  
Determination of friction of belts.  
Calibration of gauges, thermometers and indicators.  
Use of different types of steam calorimeters.  
Tests on motor driven ventilation fans.  
Test of engine driven fan and heater.  
Test on steam injector and steam pumps.  
Triplex power pump tests.  
Air compressor test.  
Test on centrifugal pump.  
Measurement of flow of water by orifices and weirs.  
Engine tests condensing and non-condensing.  
Valve setting.  
Tests from 10 to 24 hours on 300 Horse Power Aultman and Taylor  
or 200 Horse Power Stirling boilers.  
Use of electrical measuring instruments for direct and alternating  
current.  
Generator tests. Direct and alternating current.  
Motor tests and calibration for power measurements on textile ma-  
chinery.  
Determination of calorific value of coal.  
Chimney gas analysis.  
Economy tests on 50 Horse Power gas engine.  
The tests are taken up in a systematic manner and are timed to fol-  
low as nearly as possible the lectures and recitations on the same topic.

### Mill Engineering

A course of forty-five lectures and 30 hours of drawing room exercises given during the third year and taken by all regular students except Course IV. This work covers a wide range of subjects including calculations and drawings for modern mill buildings; details of mill construction; use of engineers transit and level; calculations and drawings on power distribution; proper arrangement of machinery and application of the electric drive to textile mills. In addition to the regular exercises the students of Course VI have fifteen additional lectures on power plants and a large amount of extra work in the drawing rooms enabling them to work out nearly all the problems for the design of an entire plant.

## SCHOOL ADMINISTRATION

CHARLES H. EAMES, S. B., principal of school. Massachusetts Institute of Technology, 1897. Experience: secretary of the school, and instructor in electrical engineering and mathematics. Superintendent, Light, Heat and Power Company, Lowell, and engineer with Stone & Webster, electrical engineers, Boston, Mass.

## INSTRUCTORS

### TEXTILE ENGINEERING

GEORGE H. PERKINS, S. B., chief instructor. Massachusetts Institute of Technology, 1899. Associate member American Society of Mechanical Engineers. Experience: Ludlow Manufacturing Company, Ludlow, Mass.; Lockwood, Greene & Co., Boston, Mass.

HERBERT J. BALL, S. B., instructor in mechanical engineering. Massachusetts Institute of Technology, 1906.

ULYSSES J. LUPIEN, S. B., instructor in mathematics, physics and electrical engineering. Lawrence Scientific School, 1906. Experience: draftsman, General Electric Company, Lynn, Mass.; with Winston Company, Metropolitan Water Board.

### CHEMISTRY AND DYEING

LOUIS A. OLNEY, A. C., chief instructor and professor of chemistry. Lehigh University, 1896. Experience: instructor, Brown University; consulting chemist for Lowell Machine Shop and Lowell Gas Light Co.

JOHN B. REED, A. B., instructor in chemistry. University of Michigan, 1903. Experience: instructor in chemistry, University of Maine.

WALTER B. POPE, B. S., instructor in chemistry. Worcester Polytechnic Institute, 1903. Experience: assistant chemist, State Laboratory of Hygiene, Concord, N. H.; chemist in charge of Food Laboratory, Fargo, N. D.

ROBERT R. SLEEPER, instructor in dyeing. Lowell Textile School, 1900. Experience: Read, Holiday & Sons, Limited, New York City; H. A. Metz & Co., New York City.

RUSSELL W. HOOK, instructor in dyeing. Lowell Textile School, 1905.

GEORGE A. CUSHMAN, A. M., instructor in chemistry. A. B., Harvard College, 1906; A. M., 1907.

### DECORATIVE ART

EUGENE W. CLARK, JR., chief instructor. Honor graduate, School of Design, Boston Museum of Fine Arts, 1904. Architectural experience: Little & Browne, Boston, Mass.; George H. Ingraham, Boston, Mass.

ELIZABETH WHITNEY, instructor in freehand drawing. Normal Art School, Boston, 1882. Pupil of Dr. Denman W. Ross, lecturer in design, Harvard University. Experience: teaching, fifteen years.

#### TEXTILE DESIGN AND POWER WEAVING

- FENWICK UMPLEBY, chief instructor. Professor of textile design and fabric structure. Honor graduate, textile department, Victoria College, Leeds, Eng., 1884. Experience: James Lees & Sons, Bridgeport, Pa.; chief designer, Geo. H. Gilbert Manufacturing Company, Gilbertville, Mass.; and Globe Manufacturing Company, Utica, N. Y.
- ARTHUR F. FERGUSON, instructor in textile design and cloth analysis. Lowell Textile School, 1903. Experience: Chapman, Kendal & Daniels, wholesale dry goods, Boston, Mass.
- STEWART MACKAY, instructor in hand loom weaving. Lowell Textile School, 1906.
- JOSEPH WILMOT, instructor in power weaving and warp preparation. Experience: loom fixer, U. S. Bunting Company, Lowell, Mass.
- ALBERT E. MUSARD, instructor in Jacquard weaving. Experience: Oldham Mills, Philadelphia, Pa., and Paterson, N. J.; Gloucester Rug Mills, Gloucester City, N. J.; Binder & Ellis, Philadelphia, Pa.
- JOHN R. WALMSLEY, instructor in cotton power weaving. Experience: Pierce Manufacturing Company, New Bedford, Mass.

#### COTTON YARN

- STEPHEN E. SMITH, chief instructor. Lowell Textile School, 1900. Experience: draftsman, Lowell Machine Shop, Lowell, Mass.; Atlantic Cotton Mills, Lawrence, Mass.; Shaw Stocking Company, Lowell, Mass.
- JAMES G. COMAN, B. Sc., instructor in cotton yarns. B. Sc., Mississippi A. and M. College, 1904; Lowell Textile School, 1907. Experience: Meridian Cotton Mills, Meridian, Miss.; Whitin Machine Works, Whitinsville, Mass.

#### WOOLEN AND WORSTED YARNS

- EDGAR H. BARKER, chief instructor. Massachusetts Institute of Technology, 1896. Experience: Pacific Mills, Lawrence, Mass.; E. Frank Lewis, Lawrence, wool scouring.
- JOHN N. HOWKER, instructor in wool sorting and scouring. Technical School of Saltaire, near Bradford, Eng.; certificate from City and Guilds of London. Experience: Saltaire Mills, Yorkshire, Eng.; Goodall Worsted Company, Sanford, Me.; Arlington Mills, Lawrence, Mass.
- HENRY H. CROMPTON, instructor in worsted yarns. Lowell Textile School, 1899. Experience: Arlington Mills.
- EUGENE C. WOODCOCK, instructor in woollen yarns. Lowell Textile School, 1907. Experience: Wood Worsted Mills, Lawrence, Mass.

#### FINISHING

- ARTHUR A. STEWART, chief instructor. Lachine Academy, Canada; Lowell Textile School, 1900. Experience: Dominion Woollen Manufacturing Company, Montreal, Can.; Bay State Mills, Lowell, Mass.; Nonantum Worsted Mills, Newton, Mass.; instructor, woollen and worsted yarns, Lowell Textile School.

#### LANGUAGES

PAUL E. KUNZER, Ph. D., instructor in commercial languages. Ph. D., Berlin University, 1887. President New England College of Languages, Boston, Mass.

FREDERICK A. WOOD, Ph. D., instructor in English and History. Ph. D. Columbia University, Economics 1894. A. B., Dartmouth College, 1886.

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#### ALUMNI ASSOCIATION

The Alumni Association of the School holds its annual meeting and banquet in Lowell on commencement day.

The membership of the Association is restricted to graduates of the day school. Honorary membership is open to the Board of Trustees, the Faculty and Board of Instructors and such others as may be elected by the Association.

The officers for year ending June, 1908 are:

President:	Spencer H. Haskell, '07
Vice-President:	Arthur J. Hennigan, '06
Sec.-Treasurer:	Arthur A. Stewart, '00

Board of Directors: The President, Vice-President, Secretary-Treasurer, Henry A. Bodwell, '00, and Stephen E. Smith, '00. Communications should be addressed to Arthur A. Stewart, Lowell Textile School.

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#### THE SOUTHWICK TEXTILE CLUB

The object of the Club is to promote the welfare of the School and the social and intellectual interests of its past students.

The membership is restricted to all persons who have attended the day classes of the School for at least one year and who are not, at the time of making application to the Club, students thereof.

The Club was organized on February 23, 1907, and at present has about sixty members. The officers of the Club are:

President:	Royal P. White, '04
Vice-President:	Arthur C. Varnum, '06
Sec.-Treasurer:	Arthur A. Stewart, '00

Executive Board: President, Vice-President, Secretary-Treasurer, Henry A. Bodwell, '00, and Stephen E. Smith, '00.

# REGISTER OF DAY STUDENTS

1907-1908

## THIRD YEAR

Name	Course	Address
Abbott, George R.	II	Andover, Mass.
Ballard, Horace W. C. S.	IV	Marblehead, "
Dwight, John F., Jr.	II	Dorchester, "
Farr, Leonard S.	II	Holyoke, "
Gay, Olin D.	II	Cavendish, Vt.
Hadley, Walter E.	IV	Lowell, Mass.
Huising, Geronimo H.	I	Jaro, Iloilo, P. I.
Jenckes, Leland A.	VI	Dorchester, Mass.
Lewis, LeRoy C.	IV	North Woburn, "
Lowell, James E.	II	Worcester, "
Mailey, Howard T.	II	Lynn, "
Mason, Archibald L.	VI	Billerica, "
Perkins, Joshua D.	III	East Bridgewater, "
Prince, Sylvanus C.	VI	Lowell, "
Proctor, Braman	IV	Wrentham, "
Reynolds, Fred B.	II	North Andover, "
Robinson, Ernest W.	IV	Haverhill, "
Sargent, James M.	VI	Lowell, "
Weeks, Lauris A.	III	Rochester, N. H.
Weinz, William E.	IV	Roxbury, Mass.
Wingate, William H.	IV	Lawrence, "
Winslow, Walter C.	IV	Ayer, "

## SECOND YEAR

Boyd, William	II	North Adams, Mass.
Brainerd, Arthur T.	IV	Bradford, "
Bunce, Raymond H.	III	North Adams, "
Burns, William M.	IV	" " "
Callahan, John J.	IV	Everett, "
Campos, Guy J.	III	Lowell, "
Coburn, Clarence E.	I	" "
Collingwood, Hueston	III	Plymouth, "
Conant, Harold W.	I	Littleton Common, "
Fairbanks, Almonte H.	II	Wakefield, "
Fairbanks, William S.	III	Fitchburg, "
Ferguson, William G.	III	Springvale, Me.
Fiske, Starr H.	II	Winthrop, Mass.
Fitzpatrick, William J.	VI	Brookline, "
Gray, Robert C.	III	Lawrence, "
Gyzander, Arne K.	IV	Wilmington, "
Holden, Francis C.	IV	Lawrence, "
Kay, Harry P.	II	Oxford, Me.
Laughlin, James K.	III	East Greenwich, R. I.
Levi, Alfred S.	IV	New York City
MacPherson, John R.	IV	North Adams, Mass.
McCarthy, Fred	IV	Haverhill, "
Mullen, Arthur T.	II	Dorchester, "
Newall, J. Douglas	IV	Lawrence, "

Name	Course	Address
O'Brien, John A.	III	Gleasondale, Mass.
O'Riordan, Andrew	VI	Lowell, "
O'Sullivan, Bartholomew B.	IV	Andover, "
Parkis, William L.	I	Whitinsville, "
Paton, Raymond	III	Newtonville, "
Pease, Chester C.	I	Lowell, "
Potter, Carl H.	I	Ludlow, "
Prescott, Walker F.	IV	Lawrence, "
Sanborn, Waldo H.	IV	" "
Saunders, Harold F.	IV	Andover, "
Smith, Harry M.	IV	New Hartford, Conn.
Stone, Ira A.	IV	Beachmont, Mass.
Valpey, Frank D. R.	VI	Lawrence, "
Webber, Marcus B.	VI	Bedford, "
Westcott, Charles A.	I	Hopedale, "
Whelan, Francis T.	III	Lowell, "
Williams, Roy P.	III	Springfield, "
Wood, Ernest H.	II	Andover, "
Wood, J. Carleton	IV	Haverhill, "

#### FIRST YEAR

Anagnos, Demetrius	I	Lowell, Mass.
Anderson, William	VI	Andover, "
Arienti, Peter J.	IV	Great Barrington, "
Bean, Arthur E.	IV	Haverhill, "
Blaikie, Howard M.	II	Medford, "
Brady, John T., Jr.	II	Albany, N. Y.
Bragg, Harold N.	IV	Medway, Mass.
Braun, Carl L., Jr.	IV	Lowell, "
Canty, Timothy A.	III	Reading, "
Cary, Julian C.	VI	Lowell, "
Deely, John A.	III	Pittsfield, "
Donovan, Michael R., Jr.	III	Lynn, "
Duval, Joseph E.	II	Jamaica Plain, "
Eveleth, Paul H.	II	Lowell, "
Finlay, Harry F.	IV	Lawrence, "
Fletcher, Roland H.	VI	Littleton Common, "
Gale, Harry L.	III	Malden, "
Goldberg, George	VI	" "
Gonnam, John C.	II	Swampscott, "
Hale, Elliott K.	II	Lawrence, "
Hall, Roswell G.	III	Dorchester, "
Hardy, Philip L.	VI	Andover, "
Harrington, James B.	—	Ware, "
Henry, William L.	III	Hanover, Conn.
Hitchon, Herbert M.	III	Norwich, "
Howe, Woodbury K.	I	Groton, Mass.
Hurtado, Leopoldo, Jr.	VI	Mexico City, Mexico
Jeffrey, William G.	III	Reading, Mass.
Jelleme, William O.	I	Passaic, N. J.
Keough, Wesley L.	II	Winthrop, Mass.
Kono, Hidesaburo	I	Ozu-machi, Ehime-ken, Japan
Lamb, Arthur F.	II	Rockland, Me.
Leck, Arthur J.	III	Lawrence, Mass.
Lewis, Foster P.	III	North Adams, "



Name	Course	Address
Lynch, Timothy H.	II	Lowell, Mass.
Manning, Frederick D.	IV	Fitchburg, "
McCool, Frank L.	IV	Mansfield, "
Michelson, Harold G.	I	Newark, N. J.
Morton, John R.	IV	Jamaica Plain, Mass.
Mudge, Gordon	III	Lynn, "
Murray, James A.	II	Somerville, "
Neelon, Raymond V.	IV	Medway, "
Nettel, Frank C.	II	Manchester, N. H.
Nichols, Raymond E.	VI	Wakefield, Mass.
O'Connell, Clarence E.	IV	Andover, "
O'Hara, Benjamin F.	IV	Lowell, "
Putnam, Leverett N.	IV	Danvers, "
Ray, James F.	III	Greenwich, Conn.
Reed, Norman B.	I	Malden, Mass.
Robson, Frederick W. C.	IV	Lowell, "
Sidebottom, Leon W.	IV	" "
Smith, Doane W.	II	Westfield, "
Smith, Theophilus G., Jr.	IV	Groton, "
Stebbins, Joseph B.	II	South Deerfield, "
Stronach, Irving N.	IV	Lowell, "
Vinal, Willis R.	II	Warren, Me.
Walker, Alfred S.	II	Malden, Mass.
Watson, William	III	Haverhill, "
Welch, George C.	II	Stoughton, "
Whipple, Raymond G.	IV	North Adams, "
Whitcomb, Roscoe M.	IV	Winchester, "
Whitney, Austin P.	I	Leominster, "
Wilber, Herbert H.	VI	Walpole, "
Winslow, George H.	III	Norwood, "

#### SPECIALS

Bajus, Helen	IIIb	Vancouver, B. C.
Manrique, Francisco J.	I	Lowell, Mass.
Yamanobe, Giyu	II	Mito, Tokio, Japan

# REGISTER OF EVENING STUDENTS

1907-1908

## EXPLANATORY NOTE

Course I Cotton Spinning  
 Course II (a) Woolen Spinning  
 Course II (b) Worsted Spinning  
 Course III Designing  
 Course IV Chemistry and Dyeing  
 Course V (a) Cotton Weaving  
 Course V (b) Woolen and Worsted Weaving  
 Course V (c) Dobby and Jacquard Weaving  
 Course VI (a) Mechanics  
 Course VI (b) Mechanical Drawing  
 Course VI (c) Architectural Drawing  
 Course VI (d) Freehand Drawing  
 Course VI (e) Mathematics  
 Course VII Woolen and Worsted Finishing

## POST GRADUATE

Name	Course	Address
Bastow, Stephen W.	IV	Nashua, N. H.
Hanglin, Albert J.	IV	Lowell, Mass.
Hebert, Charles L. J.	IV	" "
Hildreth, Harold W.	III	" "
Kelley, Michael H.	III	" "
Lake, William F.	III	" "
Marjerison, T. Sydney	III	Lawrence, "
Porter, George K., Jr.	III	Dorchester, "
Varnum, Arthur C.	III	Lowell, "
Webber, John F.	III	Roxbury, "
Wiggin, Leon M.	III	Lowell, "

## FOURTH YEAR

Barrington, James L.	IV	Collinsville, Mass.
Buckley, Harry	IV	Lawrence, "
Campbell, Archibald	IV	Lowell, "
Hardman, David B.	IV	Lawrence, "
Shackleton, J. Henry	IV	" "
Spurr, James H., Jr.	IV	" "

## THIRD YEAR

Anderson, Carl	IV	Lowell, Mass.
Beale, Harold E.	III	Saugus, "
Begen, Thomas W.	IIb	Lawrence, "
Bottomley, Jesse	IV	" "
Brown, James T.	III	Lowell, "
Campos, Guy J.	III	" "
Carden, Francis E.	IIb	" "
Dixon, Arthur	III	Methuen, "
Dobbs, Willie	IIb	Lowell, "
Dunn, George C.	III	" "

Name	Course	Address
Hanson, Edward	III	Lowell, Mass.
Hildreth, Harold	III	" "
Kelleher, David A.	IV	Lawrence, "
Osbeck, William J.	III	Lowell, "
Patterson, Alfred H.	III	Lawrence, "
Picken, William	III	No. Chelmsford, "
Preble, George A.	III	Lowell, "
Saalfrank, Joseph C.	III	Lawrence, "
Seddon, N. Graham	III	Lowell, "
Semple, Alexander	III	" "
Whittaker, Thomas	IIb	Lawrence, "
Whitworth, Albert	III	Lowell, "
Willgeroth, Henry J.	III	Lawrence, "
Wilmot, Joseph	III	Lowell, "

## SECOND YEAR

Aitken, Alexander	VIa	Lowell, Mass.
Allen, Walter M. N.	VIa	" "
Bachelder, Clarence H.	VIa	" "
Belanger, Ernest M.	IV	" "
Benoit, Benjamin L.	VIb	" "
Berry, Alfred H.	VIa	" "
Booth, Arthur	III	" "
Bowen, Herbert E.	III	Methuen, "
Bridges, George E.	VIa	Lowell, "
Brunelle, Oliver	VIc	" "
Butler, Elizabeth M.	VIc	" "
Carney, William J.	I	" "
Carr, Henry I.	IV	Lawrence, "
Christison, Hugh	IV	Methuen, "
Cockell, Frederick H.	III	" "
Coffin, Arthur R.	IIb	Lawrence, "
Craig, James B.	III	Lowell, "
Dulligan, Charles E.	VIa	Andover, "
Dulligan, Lawrence	VIa	Lowell, "
Ekengren, Johan A.	VIb	" "
Ellis, Arthur G.	III	" "
Elston, Ernest	III	Lawrence, "
Farrisey, William J.	IV	Methuen, "
Gallagher, John F.	VIb	Lawrence, "
Gaunt, Ernest H.	III	Lowell, "
Gaunt, Merrill S.	III	Methuen, "
Gilinson, Philip J.	VIa	" "
Gleekman, Morris	VIb	Lowell, "
Gordon, Herbert E.	III	Lawrence, "
Gosselin, Eugene	VIc	Methuen, "
Green, Henry F.	VIb	Lowell, "
Hanson, Carl H.	VIa	" "
Hill, Ernest L.	IV	West Chelmsford, "
Hill, Harold	I	Lowell, "
Hillidge, Michael S.	VIa	Methuen, "
Hillier, Arthur P.	IIb	Lowell, "
Holmes, Fred W.	VIa	No. Chelmsford, "
Holt, Harry C.	VIa	Lowell, "
Houston, William I.	III	" "
		Lawrence, "

Name	Course	Address
Hutton, John	IV	Lowell, Mass.
Hutton, John M.	III	" "
Ingham, Benjamin W.	I	" "
Jackson, Frank	VIb	Methuen, "
Jordan, Frederic W.	IV	Lowell, "
Kaler, Harold F.	VIb	" "
Keene, Thomas R.	VIb	" "
Kelley, Bernard J., Jr.	VIc	" "
Knowles, Frank E.	IV	" "
Lake, Mabelle D.	VIc	" "
Lincourt, Henry E.	VIb	" "
MacLachlan, Alexander L.	VIa	" "
MacRitchie, Donald	VIc	" "
Macy, Freeman L.	I	" "
Maker, Isaac A.	I	" "
Marshall, Fred K. R.	VIa	Methuen, "
Mathison, Frederick C.	VIc	Lowell, "
McLay, John	IIb	So. Lawrence, "
Miller, Anthony W.	VIc	West Chelmsford, "
Morrison, John A., Jr.	VIa	So. Lawrence, "
Morrison, Sophia E.	VIc	Lowell, "
Mullen, Albert	VIb	" "
Nesbitt, Hedley G.	VIc	Lawrence, "
Nichols, Samuel J.	IV	Lowell, "
Nutter, James R.	VIa	" "
Orrell, Frank L.	VIb	" "
Paquin, Joseph	VIa	" "
Parsons, Joseph G.	III	" "
Pasho, Harry J.	VIa	Billerica, "
Pearson, Fred	VIa	Lowell, "
Perkins, Thomas, Jr.	I	" "
Peterson, Albert E.	VIa	" "
Peterson, Alfred O.	IIb	Lawrence, "
Petterson, Birger	VIb	Lowell, "
Redman, Henry S.	IV	" "
Regan, William D.	IV	" "
Ryan, Edward P.	I	" "
St. Linger, Hans A.	VIa	Lawrence, "
Scally, Edward	VIa	Lowell, "
Schubert, George J.	III	Lawrence, "
Schuerfeld, Harry W.	III	Dorchester, "
Sidebottom, Leon W.	IV	Lowell, "
Silcox, Samuel H.	VIa	" "
Simoneau, Verner W.	VIa	" "
Stewart, William W.	IV	Lawrence, "
Stocks, Carl W.	VIa	Lowell, "
Stott, Samuel	IV	Lawrence, "
Sykes, Alvin E.	VIa	Lowell, "
Tucker, John T.	I	" "
Vogt, Alfred	IIb	Lawrence, "
Ware, Edward W.	III	Dorchester, "
Watson, Luther F.	IIb	Methuen, "
Weigel, Frederick	VIb	Lawrence, "
Wentworth, Fred C.	IV	Lowell, "
Westcott, Charles A.	III	" "
Whitney, Frederick A.	IV	" "
Wilson, John J.	VIb	" "

# FIRST YEAR

Name	Course	Address
Abbott, Paul W.	VIa	Lowell, Mass.
Andrews, John A.	VIa-b	" "
Andriola, Henry	VIa	" "
Antcliffe, Samuel	IV	No. Andover, "
Armitage, Thomas W.	IIb	Lowell, "
Arnold, Warren II.	VII	" "
Atkinson, Richard A.	IV	Lawrence, "
Axon, James N.	VIa	Lowell, "
Bailey, Carl E.	I-III	" "
Ballantyne, William J.	III	" "
Barlow, Robert	VIa	" "
Bean, Byam M.	VIa	Billerica, "
Beck, Herman R.	VIa	Lawrence, "
Bennett, John W.	IV	" "
Berry, Alfred H.	VIe	Lowell, "
Bibber, Fred	I-VIa	" "
Bibeault, Alphonse	VIa	" "
Bicknell, Karl A.	I	" "
Blake, Chester A.	VIb	" "
Blanchard, Andrew	Vc	" "
Bodkin, Thomas U.	III	" "
Bolduc, Joseph A.	VIa	" "
Boucher, James H.	VIa	" "
Boyd, William	VIa	" "
Bradley, Edward F.	VIId	" "
Bradley, Walter H.	III	" "
Brantigam, Edgar	IV	" "
Bridges, George E.	VIa	" "
Briggs, Herbert E.	VIa	Lawrence, "
Broadbent, James H.	Vb	Lowell, "
Broadbent, William	Vb	" "
Brown, Andrew A.	IIb	" "
Brown, Harrison G.	VIa-b	" "
Burgess, Joseph H.	III	Methuen, "
Cahill, William F.	VIa	Lowell, "
Cairns, Bert	VIa	" "
Cairns, George H.	IIb	Lawrence, "
Callahan, Francis J.	IV	Lowell, "
Campbell, Edward G.	VIc	" "
Canham, Arthur W.	III	" "
Carlin, James J.	I	" "
Carr, Charles H.	I	" "
Carregher, Herbert L.	VIb	" "
Carter, Charles R.	Vb	Lawrence, "
Carter, Harry L.	VIb	Lowell, "
Caswell, Glen B.	VIe	" "
Cayer, Albert J.	VIc	" "
Chalifoux, Harold L.	VII	" "
Clark, James E.	VIb	Lawrence, "
Coburn, Clarence E.	III	Lowell, "
Cole, Wilbur R.	VIa	West Chelmsford, "
Collingwood, Hueston	III	Lowell, "
Collins, Frank J.	Va	" "
Condon, Daniel	Vb	No. Billerica, "

Name	Course	Address
Connor, Frank H.	I	Lowell, Mass.
Connors, Edward F.	VIe	" "
Constantineau, Martin	III	" "
Cook, Walter E.	IV	" "
Corr, Eben W.	Vb	" "
Corr, Fred J.	Vb	" "
Cotter, Charles E.	VIa	" "
Cox, Edward J.	III	" "
Craven, Harry	VII	Lawrence, "
Cudworth, James A., Jr.	VIb	Lowell, "
Daggett, Earle V.	VIe	" "
Daigle, Moses L.	III	Dracut, "
Dana, Herbert D.	IV	Lowell, "
Dangerfield, Henry	VIb	" "
Davis, John P.	III	" "
Davis, Myrtle A.	VIId	" "
Davis, Nathaniel B.	IIb	No. Chelmsford, "
Deehan, Charles F.	IV	Lowell, "
DeRoehn, Frank	VIb	" "
Dick, Hugo P.	Vb	Lawrence, "
Donahue, Michael F.	VIe	Lowell, "
Downing, Esther M.	VIId	" "
Downing, Stasia E.	VIId	" "
Doyle, Thomas W.	VIe	" "
Driscoll, George	Vb	" "
Dudley, Alexander	IIb	Andover, "
Dulligan, Thomas	VIa	Lowell, "
Dunbar, Walter L.	VIId	No. Andover, "
Dunning, Carlos W.	VIb	Lowell, "
Dupuis, Edward A.	VIa	" "
Dwyer, George W.	VIb	" "
Egan, Charles H.	VIId	" "
Eliades, Phote	VIa	" "
Ellis, Samuel M.	VIa	Lawrence, "
Elston, Frank, Jr.	III	Methuen, "
Farrisey, John J.	IV	Lawrence, "
Finnerty, Francis P.	VIa	Lowell, "
Fisher, Frederick L.	III	Methuen, "
Fitzgerald, Frank A.	III	" "
Fitzgerald, Thomas	VIa	Lowell, "
Flaherty, William	III	" "
Flanagan, Joseph V.	IV	Lawrence, "
Flynn, James M.	VIb	Lowell, "
Flynn, William J.	Vb	No. Billerica, "
Foley, John	Vc	Lowell, "
Francis, George J.	VIa	" "
French, Roy C.	VIe	" "
Gakidis, Alexander N.	IV	" "
Gallagher, Charles J.	Vb	" "
Gaspar, Edith E.	VIId	" "
Gibbs, Robert	VIa	Lawrence, "
Gibbs, William	VIa	" "
Gill, John	VII	" "
Gill, John T.	Vb	Lowell, "
Girard, Harry N.	IIb	" "
Glennon, Edward M.	VII	Lawrence, "



Name	Course	Address
Goggin, Edmund A.	VIb	Lawrence, Mass.
Goodchild, George	VIe	Lowell, "
Gookin, Alice L.	VIId	Wamesit, "
Gould, Fernald N.	VIa	Lowell, "
Graichen, Walter	VIa	Lawrence, "
Green, Frank L.	I	Lowell, "
Greene, Benjamin C.	I	" "
Greenhalge, James	Vc	" "
Gregoire, Charles A.	VIId	" "
Gregson, Robert B.	III	" "
Groves, William J.	IV	" "
Haggerty, Martin F.	I	" "
Hall, Irving S.	VIa	" "
Hallbauer, William R.	Vb	Lawrence, "
Hands, Howard A.	VIb	Lowell, "
Harris, Louis	VII	Jamaica Plain, "
Harrison, Joseph	IIb	Lawrence, "
Hartley, Paul	IIb	Lowell, "
Hayes, John	VIa	No. Billerica, "
Hayes, Michael C.	IIa	" "
Heaton, Forster G.	IV	No. Andover, "
Hennessey, Ambrose	VII	No. Billerica, "
Henry, William L.	VII	Lowell, "
Hering, Paul C.	III	Lawrence, "
Higgins, John A.	IV	Lowell, "
Hill, Ellsworth O. C.	IIb	Lawrence, "
Hill, Merle H.	IV	Lowell, "
Hilliard, William B.	VIa	" "
Hillidge, Michael S.	VIa	" "
Hinton, Allan	VIa	" "
Hodgson, Ralph A.	Vb	Methuen, "
Hoellrich, Martin J.	Vb	Lawrence, "
Hoffman, Fred	III	" "
Holman, Frank P.	VIId	Lowell, "
Holmes, Fred W.	VIa	" "
Hutton, John	IV	" "
Ignatius, Pentti	Vc	" "
Jackson, John	VIc	Methuen, "
Jamieson, William F.	IV	Lowell, "
Jean, Adhemard C.	I-VIa	" "
Jenkins, Andrew G.	IV	" "
Jepson, Harry	III	" "
Jewett, Harold	Vb	" "
Johnson, John	IIb	West Chelmsford, "
Jones, Paul F.	VIId	Lowell, "
Jordan, Frederic W.	IV	" "
Jorde, Linville T.	VIb	" "
Kearney, George R.	Vb	No. Billerica, "
Kelleher, Frank B.	VIa-b	Lowell, "
Kelley, Frank	III	" "
Kelley, George H.	VIb	Lawrence, "
Kelly, Edward J.	IV	No. Andover, "
Kennedy, John C.	IIb	Lawrence, "
Kennedy, William E.	VIb	" "
Kershaw, Samuel S.	IIb	No. Chelmsford, "
Kierman, Cormick A.	Vb	Lowell, "

Name	Course	Address
Kirby, Donald T.	VIb	Lowell, Mass.
Kono, Hidesaburo	VIId	" "
Lafrance, Theodore E.	IIb	Methuen, "
Lagerblad, Jarl	VII	So. Lawrence, "
Lajoie, Emil	Va	Lowell, "
Lamnides, Thomas J.	IIb	" "
Lamson, George F.	IIb	" "
Lane, Patrick J.	IIb	Lawrence, "
Larkin, Peter	VIa	Lowell, "
Lawrence, Samuel B.	IIb	Lawrence, "
Lawson, James A.	VIa	Lowell, "
Lawson, Ralph E.	VIb	Andover, "
Laycock, Frank E.	IIb	Lowell, "
Leavitt, Clarence J.	IIb	No. Chelmsford, "
Ledoux, Blanche H.	VIId	Lowell, "
Lee, Edward	Vb	" "
Leighton, Frank W.	VIb	" "
Leslie, William	VII	" "
Line, Daniel	VIId	" "
Linehan, Maurice A.	IIa	" "
Lockwood, Harry W.	III	" "
Logan, George H. S.	IV	Lawrence, "
Longley, Edwin W.	I	Lowell, "
Lorrain, John L.	VIa	" "
Loupret, Eugene E.	VIa	" "
Lowe, Philip C.	I	West Newton, "
Lynch, Dennis F.	VIa	Lowell, "
Lyons, Walter	Vb	" "
MacPherson, John R.	III	" "
Macv, Freeman L.	I	" "
Maguire, Andrew F.	IIb	" "
Mahan, James	III	" "
Maker, Isaac A.	I	" "
Malloy, Frank H.	III	" "
Marat, Walter	VIa	Lawrence, "
Martin, Charles J.	VIa	West Chelmsford, "
Matthews, William E.	IIa	Ballardvale, "
Maxey, Leo M.	VIb	Lowell, "
McAndrews, Patrick F.	I	" "
McArdle, John	VIa	" "
McAuliffe, Jeremiah P.	IIb	Lawrence, "
McAuliffe, Patrick D.	VIa-b	Lowell, "
McCabe, Joseph	IIb	" "
McCarthy, Daniel F.	IIb	" "
McClellan, David	VIb	" "
McClure, Charles G.	VIa-b	" "
McCrorey, John G.	IIb	Andover, "
McDermott, Patrick J.	VIa	Lowell, "
McGill, William E.	VII	No. Billerica, "
McGovern, James	VII	Lawrence, "
McKenna, Jerimiah J.	Vb	Lowell, "
McKinley, Benjamin H.	IV	" "
McLoon, Dudley	VIb	" "
McMillen, Fred	VIa	Billerica, "
Meguyer, George D.	IIa	Lowell, "
Metcalfe, Walter B.	IIb	No. Chelmsford, "

Name	Course	Address
Midgley, Albert	VIa	Lowell, Mass.
Mills, Forrest A.	VIa	No. Chelmsford, "
Milot, Joseph E.	VIc	Lowell, "
Mitchell, Arthur C.	Vb	Andover, "
Molloy, Edward	Vc	Lowell, "
Moorehouse, Joseph R.	VIa	Lawrence, "
Moran, John J.	I Ib	Lowell, "
Moreau, Arthur J.	III	" "
Moriarty, Frank H.	VIb	" "
Morrison, Andrew	IV	Lawrence, "
Morrison, John A., Jr.	VIa	So. Lawrence, "
Mortenson, Carl W.	IIa	No. Billerica, "
Moylan, William P.	III	Lowell, "
Murphy, Dennis F.	Vb	" "
Murphy, Edward A.	I	" "
Murphy, Patrick	Vb	" "
Murray, George A.	IV	" "
Murray, John J.	I Ib	Lawrence, "
Naylor, Richard S.	I Ib	" "
Needham, Frank	VI d	Lowell, "
Neeson, John J.	VII	" "
Nelson, Ernest H.	I	" "
Neylon, John	VIc	" "
Nickles, William C.	IV	" "
Noonan, James J.	VIa	" "
O'Brien, Daniel	I	" "
O'Brien, Joseph A.	III-VII	" "
O'Brien, Thomas M.	VIb	" "
O'Connor, John J.	VIb	" "
O'Connor, Peter J.	VIb	Andover, "
O'Hara, James	Vb	Lowell, "
O'Leary, Arthur L.	I Ib	Winthrop, "
Olsson, Gustaf F.	III	Lowell, "
O'Shea, Daniel J.	VIb	" "
Paquin, Henry	I	" "
Parker, Arthur	VII	Lawrence, "
Parsons, Joseph G.	Vb	Lowell, "
Paton, Raymond	III	" "
Patterson, Charles L.	I Ib	Lawrence, "
Pearson, James	III	Lowell, "
Perez, Angelo	I Ib	Andover, "
Perreault, Joseph E.	VIa	Lowell, "
Petterson, Birger	VIa	" "
Phelps, Mary I.	VI d	" "
Plumer, Paul T.	Vb	" "
Polk, Roy A.	VIa	" "
Prevost, Ernest R.	VIa	" "
Price, Harold	VIb	" "
Pritchard, Robert W.	VIa	" "
Pyne, John	I Ib	" "
Ramsay, Arthur D.	I	" "
Redman, Henry S.	VIa	" "
Reynolds, Frank T.	VIa	" "
Richardson, Leon W.	VIb	" "
Rivard, Alfred A.	IV	" "
Robinson, Thomas	I	" "

Name	Course	Address
Rodger, Raymond M.	IV	Lowell, Mass.
Rogers, John F.	IIb	" "
Rollins, Henry E.	IV	Lawrence, "
Rooney, Hugh	IIb	Lowell, "
Root, Frank, Jr.	III	" "
Roussell, John B.	Va	" "
Roy, Edward	III	" "
Russell, Robert	I	" "
Rutyna, Bernard	Vb	" "
St. Linger, Hans A.	VIa	Lawrence, "
Sanborn, Waldo H.	III	Lowell, "
Savage, Thomas J.	VIb	" "
Savory, John W.	VIa-b	" "
Scanlon, John J.	IIa	" "
Scheffel, Ernest H.	IV	Lawrence, "
Schermerhorn, George E.	Va	Lowell, "
Schuster, William F.	VII	Lawrence, "
Scott, James W.	VIb	Lowell, "
Scribner, James F.	I	" "
Scribner, Paul A.	IIb	No. Chelmsford, "
Senior, Hubert H.	IIb	Lowell, "
Seymour, John S.	Vb	" "
Shaw, Stewart J.	VIa	" "
Shea, Daniel J.	I	Tyngsboro, "
Sheehan, Maurice J.	IIa	Lowell, "
Shiers, Winfield	VIa	Lawrence, "
Simoneau, James C., Jr.	III	Lowell, "
Simoneau, Verner W.	IV	" "
Simpson, Adam	IIa	" "
Smith, John J.	VIb	" "
Sodofski, Joseph	VIa	" "
Spurr, Albert R.	VII	Lawrence, "
Stetson, Martin R.	IV	Lowell, "
Stevens, Charles A.	IIb	" "
Stewart, Charles	Va	" "
Stocks, Carl W.	VIa	" "
Stott, James	VIa	Lawrence, "
Sturtevant, Herbert M.	VIe	Lowell, "
Sullivan, Humphrey F.	I	" "
Sullivan, John James	VIa	" "
Sullivan, John Joseph	Vb	" "
Sullivan, Michael	VIb	Dracut, "
Sullivan, Thomas L.	VIa	Lowell, "
Swanson, Anton W.	VIa	" "
Teichmann, Alfred A.	Vb	Lawrence, "
Thompson, George M.	IIb	Lowell, "
Thrall, Laura M.	III	Dracut, "
Tierney, Joseph P.	Vb	Lowell, "
Toohy, Henry	III	" "
Toye, Lewis S.	VII	" "
Trudel, Louis	I	" "
Trull, Elmer	VIb	" "
Turner, Roscoe C.	VIe	" "
Turvey, Charles S.	VIa	" "
Tyrrell, Robert J.	VIe	" "
Vinal, Hazel L.	VIId	" "

Name	Course	Address
Wainwright, Frederick C.	IIb	Lawrence, Mass.
Walker, Herbert	VIa	Lowell, "
Walker, John J.	IV	" "
Walker, Kirke W.	VIa	" "
Wallace, Charles C.	Vb	" "
Walsh, Michael L.	I	" "
Waterworth, William	VIc	Methuen, "
Weiss, William P.	IIb	Lawrence, "
Welch, Benjamin L.	VIb	Lowell, "
Wentworth, Fred C.	IV	" "
Wentworth, Harold C.	VIa	" "
Wheatly, Joseph H.	IIa	Ballardvale, "
Wiesner, Arthur B.	IIb	Lawrence, "
Williams, Edward E.	VIa	" "
Williams, Roy P.	III	Lowell, "
Winn, James	I	" "
Witschel, Alfred C. F.	IIb	Lawrence, "
Wolf, William C.	Vb	" "
Woobank, Wilfred	VIb	" "
Wood, Albert A.	I	Lowell, "
Wood, Harry	IV	" "
Wood, Horace D.	IIb	Lawrence, "
Wood, Jonathan	Va	Lowell, "
Worth, Samuel	Va	" "
Wright, Arthur A.	IV	" "
Wright, Duncan	IIb	No. Chelmsford, "
Wyman, William N.	VIa	Westford, "
Yare, John F.	III	Lowell, "
Young, Richard, Jr.	Va	" "

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## SUMMARY

Day Students .....	132
Evening Students .....	500
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Total .....	632
Names counted twice .....	28*
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Total .....	604

## EVENING CLASS OF 1908

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Certificates awarded as follows, May 7, 1908.

### COURSE I—2 YEARS. (Cotton Spinning)

William Joseph Carney	Lawrence, Mass.
Harold Hill	Methuen, "
Benjamin William Ingham	Lowell, "
Isaac Albee Maker	" "
Thomas Perkins, Jr.	" "
John True Tucker	" "

### COURSE IIa—1 YEAR. (Woolen Spinning)

Carl W. Mortenson	North Billerica, Mass.
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### COURSE IIb—3 YEARS. (Worsted Spinning)

Thomas William Begen	Lawrence, Mass.
Francis Edward Carden	Lowell, "
Willie Dobbs	" "
Thomas Whittaker	Lawrence, "

### COURSE III—3 YEARS. (Designing)

James Thomson Brown	Lowell, Mass.
Arthur Dixon	Methuen, "
George Clifford Dunn	Lowell, "
Edward Hanson	" "
William Julius Osbeck	" "
Alfred Henry Patterson	Lawrence, "
William Picken	North Chelmsford, "
George Alexander Preble	Lowell, "
Joseph C. Saalfrank	Lawrence, "
N. Graham Seddon	Lowell, "
Alexander Semple	" "
Henry John Willgeroth	Lawrence, "
Joseph Wilmot	Lowell, "

### COURSE III—1 YEAR. Post Graduate. (Designing)

William Frank Lake	Lowell, Mass.
Thomas Sydney Marjerison	Lawrence, "
George Kingsbury Porter, Jr.	Dorchester, "
Arthur Clayton Varnum	Lowell, "
John Francis Webber	Roxbury, "
Leon Marshall Wiggin	Lowell, "

### COURSE IV—4 YEARS. (Chemistry and Dyeing)

James Louis Barrington	Collinsville, Mass.
Harry Buckley	Lawrence, "
Archibald Campbell	Lowell, "
David Buckley Hardman	Lawrence, "
John Henry Shackleton	" "
James H. Spurr, Jr.	" "



COURSE Va—1 YEAR. (Cotton Weaving)

George E. Schermerhorn	Lowell, Mass.
Charles Stewart	" "
Jonathan Wood	" "
Richard Young, Jr.	" "

COURSE Vb—1 YEAR. (Woolen and Worsted Weaving)

James Henry Broadbent	Lowell, Mass.
William Broadbent	" "
Charles Richard Carter	Lawrence, "
Eben William Corr	Lowell, "
Fred James Corr	" "
Hugo Paul Dick	Lawrence, "
William Joseph Flynn	North Billerica, "
William Richard Hallbauer	Lawrence, "
Martin J. Hoellrich	" "
Jerimiah Joseph McKenna	Lowell, "
Paul Tucker Plumer	Lowell, Mass.
Alfred August Teichmann	Lawrence, "
William Carl Wolf	" "

COURSE Vc—1 YEAR. (Dobby and Jacquard Weaving)

James Greenhalge	Lowell, Mass.
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COURSE VI—3 YEARS. (Mechanics and Electricity)

Alfred Herbert Berry	Lowell, Mass.
Fred Knox Russell Marshall	Methuen, "
James Robert Nutter	Lowell, "
Edward Scally	" "
Verner William Simoneau	" "

COURSE VII—1 YEAR. (Woolen and Worsted Finishing)

Warren Henry Arnold	Lowell, Mass.
Harry Craven	Lawrence, "
Louis Harris	Jamaica Plain, "
Ambrose M. Hennessey	North Billerica, "
Jarl Lagerblad	South Lawrence, "
William Edward McGill	North Billerica, "
James McGovern	Lawrence, "
William Fred Schuster	" "
Albert R. Spurr	" "

# ALPHABETICAL LIST OF GRADUATES

Name	Course	Class	Day or Evening
Abbott, Edward M.	II	1904	D
Abbott, Paul W.	I	1906	E
Ackroyd, Theodore C.	IIb	1907	E
Adams, Henry S.	IIa	1903	E
Adams, Henry S.	I	1903	D
Adams, Michael E.	VI	1904	E
Adams, William R.	IIa	1902	E
Amiot, Louis H.	Va	1906	E
Armstrong, Elias B.	IIb	1906	E
Arundale, Henry B.	II-III-V	1903	D
Arundale, Henry B.	II	1907	D
Aspinwall, William	IIb	1901	E
Avery, Charles H.	II	1906	D
Bailey, Joseph W.	I	1899	D
Bain, William A.	VII	1907	E
Bake, Herbert	III	1903	E
Bake, Herbert	P. G. III	1906	E
Bake, Herbert	VII	1907	E
Baldwin, Arthur L.	IV	1900	D
Baldwin, Frederick A.	II	1904	D
Ballinger, Frederick W.	IIb	1907	E
Balmforth, James H.	IIa	1903	E
Balmforth, James H.	IIa-b	1904	E
Balmforth, William F.	VI	1904	E
Balmforth, Martha B.	(See French)		
Barber, James E.	IIb	1907	E
Barker, John P.	V	1904	E
Barlow, Robert	V	1902	E
Barr, I. Walwin	I	1900	D
Barracrough, John C.	I	1907	E
Barrington, John A.	IV	1904	E
Barry, Edward J.	III	1903	E
Bastow, Henry	III	1903	E
Bastow, Henry	V	1903	E
Bastow, Stephen W.	IV	1907	E
Baxter, Alvah J.	IIa	1903	E
Bayard, Pierre P.	III	1907	E
Begen, Thomas W.	IIb	1907	E
Bell, Frederick W.	IIa	1903	E
Bennett, Edward H.	V	1903	D
Benoit, William A.	Va	1907	E
*Berry, Frank M.	III	1899	E
*Berry, Frank M.	V	1901	E
Binns, Heaton	II-V	1899	E
Binns, Heaton	VI	1902	E
Bloom, Wilfred N.	IV	1903	D
Bodwell, Henry A.	II	1900	D
Boucher, John L.	VI	1904	E
Bouille, Arthur L.	Vb	1907	E
Bowie, Samuel A.	VI	1903	E
Bowring, George P. B.	VI	1902	E
Boyd, George A.	I	1903	D
Bradford, Roy H.	II	1906	D
Bradley, Richard H.	V	1901	D

\*Deceased

Name	Course	Class	Day or Evening
Brainerd, Irving L.	I	1902	E
Brannen, Leon V.	III-V	1907	D
Brannen, Leon V.	IIa	1907	E
Brickett, Chauncey J.	II	1900	D
Broadbent, James T.	I	1899	E
Brooks, Noah	III-V	1901	E
Brouder, John J.	III	1906	E
Brouder, John J.	VII	1907	E
Brown, James P.	III	1905	E
Brown, James P.	P. G. III	1906	E
Brown, William G.	IIb	1906	E
Bryant, Ernest L.	VI	1905	E
Buchan, Donald C.	II	1901	D
Bucklitsch, Gustave J.	IIb	1907	E
Burgess, Joseph H.	Va	1906	E
Burgess, Joseph H.	Vb	1907	E
Burghardt, Edward S.	IIa	1902	E
Burghardt, Paul C.	IIa	1901	E
Burke, Thomas F.	I	1905	E
Burnham, Frank E.	IV	1902	D
Burnham, Joseph W.	III	1906	E
Burnham, Wilmont V.	Vb	1906	E
Burns, Edward J.	IV	1905	E
Burns, James E.	IV	1905	E
Burrage, Katherine C.	IIIb	1899	D
Burrage, Katherine C.	P. G. IIIb	1900	D
Butler, Benjamin O.	VI	1904	E
Butterworth, Charles A.	Va	1907	E
Butterworth, John A.	IIb	1907	E
Buzzell, William O.	III	1901	E
Buzzell, William O.	P. G. III	1902	E
Byam, Walter S.	VI	1903	E
Cady, Dennis J.	V	1903	E
Callahan, Patrick A.	VI	1904	E
Campbell, Albert D.	IIb	1900	E
Campbell, Laura E.	IIIb	1900	D
Campbell, Louise P.	IIIb	1903	D
Campbell, Orison S.	II	1903	D
Carden, Francis E.	IIb	1907	E
Carlson, Ernest B.	IIb	1907	E
Caron, Cleophas	I	1905	E
Carr, George E.	I	1905	D
Carter, Robert A.	IV	1902	D
Cawthra, Albert B.	IIb	1900	E
Chamberlin, Frederick E.	I	1903	D
Cheetham, John James	III	1901	E
Cheetham, John James	P. G. III	1902	E
Cheetham, John Joseph	I	1904	E
Chippindale, Ernest W.	IIb	1901	E
Church, Charles R.	II-V	1906	D
Churchill, Charles W.	III	1906	D
Clapp, F. Austin	II	1904	D
Clogston, Raymond B.	IV	1904	D
Colby, Arthur D.	I	1900	E
Cole Edward E.	IV	1906	D
Cole, James T.	II	1905	D

Name	Course	Class	Day or Evening
Collier, John	III	1899	E
Collier, John	P. G. III	1902	E
Collins, John A.	IIa-b	1905	E
Coman, James G.	I	1907	D
Conklin, Jennie G.	IIIb	1905	D
Conley, Frederick A.	VI	1904	E
Connors, Edward F.	VI	1904	E
Cook, Cheney E.	III	1905	E
Cowdell, Herbert	V	1901	E
Cowdrey, Charles E.	V	1902	E
Craig, Albert W.	IV	1907	D
Craig, Clarence E.	III	1902	D
Cremin, Daniel J.	I	1902	E
Crompton, Henry H.	II	1899	E
Culver, Ralph F.	IV	1904	D
Curran, Charles E.	II-III-V	1902	D
Currier, Herbert A.	I	1906	D
Currier, John A.	II	1901	D
Curtis, Frank M.	I	1906	D
Curtis, William L.	II	1905	D
Custer, James J. E.	V	1905	E
Cutler, Benjamin W., Jr.	III	1904	D
Cuttle, James H.	II	1899	D
Dana, Clarence A.	VI	1905	E
Davis, Henry	IIb	1901	E
Davis, Prentice T.	I	1904	E
Delmage, Edward R.	III	1904	E
Dempsey, John W.	IIa	1904	E
Dewey, James F.	II	1904	D
Dick, Hugo P.	III	1905	E
Dick, Hugo P.	P. G. III	1906	E
Dick, Hugo P.	IIb	1907	E
Dickson, Andrew	IIa	1906	E
Dillon, James H.	III	1905	D
Dimlick, Benjamin C.	III	1905	E
Dimlick, Benjamin C.	P. G. III	1906	E
Dobbs, Willie	IIb	1907	E
Dodge, Charles P.	IIa	1907	E
Dodge, Frank	I	1906	E
Donahue, Michael F.	VI	1904	E
Donald, Albert E.	II	1904	D
Donnellan, Frank T.	IIa	1902	E
Donnellan, Frank T.	V	1903	E
Donnelly, James	I	1900	E
Donovan, Daniel F.	IIa	1901	E
Doole, George L.	VI	1904	E
Dooley, Edward W.	VI	1904	E
Duce, Benjamin	III	1906	E
Duce, Benjamin	VII	1907	E
Dudley, George E.	I	1902	E
Duggan, Francis P.	VI	1904	E
Ehrenfried, Jacob B.	II-V	1907	D
Ellis, George W.	VII	1906	E
Elston, Fred R.	III	1900	E
Emerson, Frank W.	II	1903	D
Erbe, Gustave	VI	1905	E

Name	Course	Class	Day or Evening
Evans, Alfred W.	III	1903	D
Evans, William R.	III	1903	D
Evison, William A.	V	1901	E
Ewer, Nathaniel T.	IV	1901	D
Eyers, John T.	IV	1906	E
Farmer, Chester J.	IV	1907	D
Farrell, Thomas	IIa	1901	E
Fels, August B.	II	1899	D
Ferguson, Arthur F.	I	1902	D
Ferguson, Arthur F.	I	1903	D
Ferguson, Thomas	V	1902	E
Field, Charles W.	VI	1902	E
Fleming, Frank E.	IV	1906	D
Flint, Leon G.	III	1907	E
Flynn, John J.	VI	1903	E
Forrest, Fred G.	IIa	1902	E
Fortune, David A.	IIb	1902	E
Foster, Clifford E.	II	1901	D
Foster, Sherwood L.	I	1905	E
Frame, William	V	1901	E
Frank, Emil M.	III	1904	E
Frank, Emil M.	P. G. III	1906	E
Frechette, Alphonse J.	IIb	1907	E
French, Ernest J.	I	1905	E
French, Martha Balmforth	III	1903	E
Fuller, George	I	1903	D
Fuller, John M.	V	1906	E
Gagan, John H.	V	1901	E
Gahm, George L.	II	1906	D
Garner, William	III	1903	E
Gaunt, Alfred C.	III	1899	E
Gaunt, Alfred C.	P. G. III	1902	E
Gaunt, Alfred C.	IIa	1903	E
Gaunt, Alfred C.	IIb	1904	E
Gay, Earle B.	I	1905	E
Gerrish, Walter	III	1903	D
Gillispie, James E.	VII	1907	E
Gillon, Sara A.	IIIb	1906	D
Good, Henry	I	1902	E
Goodchild, George	I	1903	E
Goodchild, George	VI	1905	E
Goodhue, Amy H. (See Harrison)			
Grant, Archibald	IIb	1901	E
Gray, Finley M.	VI	1903	E
Gregson, Robert B.	Va	1906	E
Gregson, Robert B.	I-Vc	1907	E
Grouke, Michael	IIb	1901	E
Haartz, John C.	VII	1907	E
Haas, Ignatius	I	1907	E
Haigh, Walter	III	1902	E
Haigh, William	Vb	1906	E
Halsell, Elam R.	I	1904	D
Hamblett, Harry A.	I	1907	E
Hanglin, Albert J.	IV	1907	E
Hanglin, William E.	Vb	1907	E
Harder, Elmer E.	VI	1905	E

Name	Course	Class	Day or Evening
Harmon, Charles F.	I	1899	D
Harris, Charles E.	I	1905	D
Harris, George S.	I	1902	D
Harrison, Amy Goodhue	IIb	1900	D
Harrison, Amy Goodhue	P. G. IIb	1901	D
Hartwell, Henry E.	VI	1906	E
Haskell, Spencer II.	II	1907	D
Haskell, Walter F.	IV	1902	D
Hathorn, George W.	IV	1907	D
Haven, George W.	III	1905	E
Haworth, Joseph	VI	1902	E
Hebert, Charles L. J.	IV	1907	E
Hempel, Frank	V	1904	E
Hennigan, Arthur J.	II	1906	D
Higgins, James A.	IIa	1903	E
Higgins, James A.	IIa-b	1904	E
Hildreth, Harold W.	II-V	1906	D
Hildreth, Harold W.	II	1907	D
Hill, Daniel	IIb	1901	E
Hintze, Thomas F.	I	1906	D
Hitchcock, Thomas B.	I-IIa-III	1901	E
Hitchen, Harry S.	Vb	1907	E
Hitchen, Thomas G.	Vb	1907	E
Hoessler, Carl, Jr.	III	1906	E
Hogan, James A.	V	1902	E
Holgate, Benjamin	III	1902	D
Holgate, Benjamin	V	1903	D
Holgate, Charles H.	IIa	1901	E
Hollings, James L.	I	1905	D
Hook, Russell W.	IV	1905	D
Horsfall, George G.	II-III-V	1904	D
Howard, John	V	1900	E
Howard, John	III	1903	E
Howard, John	IIa	1906	E
Howard, John	VII	1907	E
Howard, Thomas	V	1905	E
Hoyle, Edward	IIb	1902	E
Hoyle, Joseph	IIb	1904	E
Hoyt, Charles W. H.	IV	1907	D
Hunt, Chester L.	III	1905	D
Hunt, Herbert R.	VI	1905	E
Hunter, Ralph	III	1901	E
Hunter, Ralph	V	1903	E
Hunton, Lewis G.	IV	1905	E
Hutton, Clarence	V	1900	E
Hutton, Clarence	III	1903	D
Hutton, Harold	V	1906	E
Hutton, John M.	Vb	1906	E
Ignatius, Pentti	Va	1907	E
Inberg, Magnus	I	1906	E
Jeannotte, Arthur	VI	1904	E
Jennings, James J.	III	1903	E
Jepson, Harry	Vb	1907	E
Johnson, Ernest A.	IIa-b	1902	E



Name	Course	Class	Day or Evening
Johnson, Ernest A.	V	1906	E
Johnson, Samuel L.	V	1903	E
Jones, Everett A.	II	1904	D
Jones, Everett A.	III	1905	D
Jones, William J.	IIb	1900	E
Jones, William J.	IIa	1901	E
Jury, Alfred E.	IV	1904	D
Keleher, John J.	IIb	1903	E
Kellett, Irvine	II	1899	E
Kelley, Michael H.	I	1902	E
Kelley, Michael H.	III	1907	E
Kent, Clarence L.	III-V	1906	D
Kent, Ernest J.	IIb	1902	E
Kenworthy, Joseph	I	1905	E
Kershaw, William E.	V	1904	E
Kidd, Thomas E.	IV	1906	E
Killerby, Walter	IIb	1901	E
Kimball, Irving D.	VI	1905	E
Kingsbury, Percy F.	IV	1901	D
Kirsch, Alfred O.	Vb	1907	E
Knowland, Daniel P.	IV	1907	D
Knowles, Frank E.	I	1903	E
Laffert, August W.	III	1906	E
Laffert, August W.	VII	1907	E
Lake, William F.	III	1907	E
Lakeman, Fannie S.	IIIb	1900	D
Lamont, Walter M.	IIb	1902	E
Lamson, George F.	I	1900	D
Lamson, George F.	VI	1905	E
Lane, John W.	I	1906	D
Lane, John W.	I-V	1907	D
Langevin, Felix D.	VI	1904	E
Law, Alfred	IIb	1901	E
Lawliss, Augustine J.	V	1902	E
Lawrence, Charles	I	1903	E
Leach, John P.	I-V	1900	D
Leach, Joseph W.	V	1903	E
Lee, Charles	I	1902	E
Lee, William H.	V	1905	D
Leith, Edwin E.	III	1902	E
Lewis, Walter S.	IV	1905	D
Libby, C. Robert	VI	1902	E
Lincourt, Hector L.	VI	1903	E
Linkletter, Alfred C.	VI	1905	E
Lord, Harry D.	III	1904	E
Lord, Wilfred	III	1901	E
Lord, Wilfred	IIb	1903	E
Lord, Wilfred	IIa	1904	E
Lovell, Charles E.	VI	1905	E
Lucey, Edmund A.	II	1904	D
Mackay, Stewart	III	1907	D
MacPherson, Wallace A.	III	1904	D
Maden, Harry	IIb	1900	E
Maguire, James H.	VI	1905	E
Maguire, James H.	I	1906	E

Name	Course	Class	Day or Evening
Marjerison, Isaiah D.	II	1899	E
Marjerison, T. Sydney	III	1907	E
Marinel, Walter N.	I	1901	D
Martin, John C., Jr.	IIa-b	1905	E
Martin, Willard E.	III	1907	E
Mason, Frederick A.	I	1903	E
McAlister, John W.	V	1899	E
McBride, Robert G.	IIa	1904	E
McCarthy, Joseph F.	III	1906	E
McDonnell, William H.	I-V	1906	D
McKenna, Hugh F.	IV	1905	D
McLaughlin, Peter J.	I	1906	E
McLay, John	Vb	1906	E
McManus, Hugh	V	1905	E
McQuade, Hugh B.	V	1901	E
Meadows, William R.	I	1904	D
Meek, Lotta	IIIb	1907	D
Merchant, Edith C.	IIIb	1900	D
Merrill, Edwin C.	VI	1904	E
Merriman, Earl C.	II	1907	D
Michelmores, Harry	III	1906	E
Michelmores, Harry	VII	1907	E
Midwood, Arnold J.	IV	1905	D
Miller, Emil H.	V	1904	E
Minge, Jackson C.	I-V	1901	D
Minge, Jackson C.	III	1901	E
Moir, Alexander L.	III	1899	E
Moir, Alexander L.	P. G. III	1903	E
Molloy, Andrew	V	1902	E
Molloy, Andrew	III	1905	E
Molloy, Andrew	P. G. III	1906	E
Moore, Everett B.	I	1905	D
Moorehouse, Thomas	VI	1904	E
Moorhouse, William R.	IV	1901	D
Morris, Frank A.	V	1901	E
Morrison, Fred C.	I	1903	D
Mortenson, Carl W.	III	1903	E
Morton, Albert N.	IIb	1906	E
*Mozley, Arthur	VI	1903	E
Murphy, Cornelius D.	IIa	1906	E
Murphy, John H.	VI	1904	E
Myers, James W.	III-IV	1903	E
Myers, James W.	VII	1907	E
Najarian, Garabed	IV	1903	D
Nelson, Charles E.	IIb	1907	E
Nelson, Ernest H.	IIb	1900	E
Nelson, Ernest H.	IIa	1901	E
Nelson, Ernest H.	IIi	1906	E
Newcomb, Guy H.	IV	1906	D
Nicholson, Richard	IIb	1903	E
Noble, John T.	V	1899	E
Noble, John T.	III	1901	E
Noonan, Denis T.	III	1903	E
Notman, Frederick W.	I	1904	E
Nugent, Thomas A.	II-V	1899	E
Nugent, Thomas A.	VI	1902	E

\*Deceased

Name	Course	Class	Day or Evening
O'Brien, David A.	IV	1906	E
O'Brien, Michael F.	IIb	1907	E
O'Donnell, John D.	I	1904	D
Ogley, Samuel A.	IIb	1900	E
O'Hara, William F.	IV	1904	D
O'Neill, Peter F.	IV	1905	E
Osgood, Charles F.	I	1900	E
Osgood, Charles F.	VI	1902	E
Overend, John	V	1905	E
Palmer, G. Buel	III	1903	E
Parker, B. Moore	I	1901	D
Parker, Everett N.	I	1904	D
Parker, Everett N.	I	1905	D
Parker, Harry C.	V	1900	D
Patrick, Alexander	III	1904	E
Pedler, William A.	I	1906	E
Peel, Hudson	IIb	1901	E
Perkins, John E.	III	1900	D
Petty, George E.	I-V	1903	D
Pihl, Christian E.	VI	1906	E
Pittendreigh, John M.	I	1906	E
Porter, George K., Jr.	III	1907	E
Potter, Richard W.	V	1902	E
Pradel, Alois J.	III	1900	D
Pradel, Anna Walker	IIIb	1903	D
Ramsdell, Theodore E.	I	1902	D
*Rasche, William A.	III	1903	D
Raymond, Charles A.	IV	1907	D
Read, Paul A.	VII	1907	E
Reardon, Timothy H.	VI	1906	E
Redman, Henry S.	III	1904	E
Redman, Henry S.	V	1905	E
Redman, Henry S.	I	1907	E
Reed, Foster C. K.	VI	1904	E
Reynolds, Eugene A.	VI	1906	E
Reynolds, Hiram L.	III	1901	E
Reynolds, Isabel H.	III-V	1903	D
Reynolds, Isabel H.	P. G. III-V	1906	D
Rhodes, Joseph E.	V	1904	E
Richards, Francis G.	IIa	1906	E
Ritter, Alfred E.	IIb	1907	E
Robbins, John	IIb	1907	E
Roberson, Pat H.	I	1905	D
Roberts, Carrie I.	IIIb	1905	D
Robinson, William C.	III-V	1903	D
Rockwell, Henry D.	IIa	1903	E
Rockwell, Samuel F.	IIa	1902	E
Rooney, George W.	I	1904	E
*Rowell, Herman C.	I-IIb	1900	E
Rushworth, Walter	VI	1906	E
Saunders, Edward B.	III	1901	E
Scanlon, Edward J.	IIb	1901	E
Schermerhorn, George E.	I	1902	E
Schofield, John S.	III	1903	E
Schoon, Fenton	IIb	1903	E

\*Deceased

Name	Course	Class	Day or Evening
Schubert, George J.	V	1906	E
Senior, George	Va	1906	E
Senior, George	I-Vc	1907	E
Shannon, Philip J.	V	1901	E
Sharpe, John R.	VI	1906	E
Shaw, James	V	1904	E
Sheppard, Byron H.	VI	1906	E
Silcox, Arthur E.	I	1900	E
Silk, Frederick C. M.	IV	1905	E
Silk, Patrick E.	VII	1906	E
Simola, Emil J.	IIa-b	1905	E
Skinner, Clarence W.	III	1905	E
Skinner, Clarence W.	P. G. III	1906	E
Skinner, Clarence W.	VII	1907	E
Sleeper, Robert R.	IV	1900	D
*Smith, Albert A.	I	1899	D
Smith, Arthur	III	1905	E
Smith, Arthur	P. G. III	1906	E
Smith, Arthur	Va	1906	E
Smith, Arthur	Vc	1907	E
Smith, Edward	I	1904	E
Smith, Ernest B.	Vb	1907	E
Smith, Fred	IIb	1901	E
Smith, George A.	III	1905	E
Smith, George A.	P. G. III	1906	E
Smith, James	Vb	1907	E
Smith, John W.	IIb	1904	E
Smith, Percy H.	Vb	1907	E
Smith, Ralston F.	I	1904	D
Smith, Stephen E.	I	1900	D
Smith, William E.	III	1905	E
Smith, William E.	P. G. III	1906	E
Smith, William E.	VII	1907	E
Smith, William H.	IIb	1902	E
Snelling, Fred N.	II	1903	D
Snow, Fred L.	IV	1900	E
Spedding, Ephraim H.	III	1899	E
Spiegel, Edward	V	1903	D
Sterling, Walter	III	1904	E
Stevens, Dexter	I	1904	D
Stevens, Frank W.	VI	1905	E
Stevenson, Murray R.	III-V	1903	D
Stevenson, William	II	1899	E
Stevenson, William	III	1902	E
Stewart, Arthur A.	II	1900	D
Stewart, Walter L.	III	1903	D
Stockham, Burton I.	IV	1903	E
Stockham, Burton I.	P. G. IV	1904	E
Stohn, Alexander C.	III-V	1906	D
Stopherd, William H.	II-V	1899	E
Stopherd, William H.	VI	1902	E
Stopherd, William H.	III	1905	E
Stopherd, William H.	P. G. III	1906	E
Storer, Francis E.	II	1907	D
Stursberg, Paul W.	II	1907	D
Swan, Guy C.	II	1906	D

\*Deceased

Name	Course	Class	Day or Evening
Swift, Edward S.	V	1899	E
Swift, Edward S.	I	1901	E
Swift, Edward S.	I	1902	D
Syme, James F.	II	1900	D
Tarpey, John F.	IIa	1904	E
Thomas, Roland V.	I	1905	D
Thompson, Charles B.	VI	1904	E
Thompson, Everett L.	I	1905	D
Thompson, Henry J.	IV	1900	D
Tilton, Elliott T.	II	1899	D
Tonge, John	IV	1905	E
Tonge, Matthew	III	1903	E
Toovey, Sidney E.	V	1904	D
Umpleby, Thomas B.	V	1902	E
Upton, Frank A.	I	1903	E
Varney, Manley H.	III	1902	E
Varney, Manley H.	I	1903	E
Varnum, Arthur C.	II	1906	D
Varnum, Arthur C.	Vb	1907	E
Vogt, Alfred H.	III	1902	E
Vogt, Harry A.	Vb	1906	E
Walker, Anna G. (See Pradel)			
Walker, David	III	1902	E
Walker, David	P. G. III	1903	E
Walker, William, Jr.	VII	1906	E
Ward, James J.	VII	1906	E
Wardrobe, William L.	I	1900	E
Warren, Philip H.	II	1905	D
Waterhouse, Joseph	IV	1900	E
Waterworth, Frank W.	Vb	1907	E
Webb, Francis H.	V	1904	E
Webb, Francis H.	III	1907	E
Webb, Frank H.	IV	1904	D
Webber, Arthur H.	IV	1901	D
Webber, John F.	III	1907	E
Wesson, Paul B.	I	1901	E
Whalberg, Einar S.	I	1907	E
Wheelock, Stanley H.	II	1905	D
*Whitcomb, Harry E.	I	1906	E
White, Royal P.	II	1904	D
Whitehead, Bennett	IIb	1901	E
Whittaker, Thomas	IIb	1907	E
Wiggin, Leon M.	III	1907	E
Wightman, William H.	IV	1906	D
Wilde, Thomas E.	IIa	1905	E
Willey, Frank S.	I	1901	E
Williamson, Isaac F.	IV	1901	E
Wilmot, William	III	1899	E
Wilson, Calvin E.	IIb	1902	E
Wilson, George H.	IIb	1902	E
Wilson, John S.	II	1903	D
Wilson, Walter E. H.	I	1904	D
Wilton, George H.	III	1899	E
Wing, Charles T.	III	1900	E
Wing, Charles T.	III	1902	D
Wise, Paul T.	II	1901	D

\*Deceased

Name	Course	Class	Day or Evening
Wiswall, Frank T.	V	1905	E
Wolf, William C.	Va	1907	E
Wolger, John J.	III	1907	E
Wood, Herbert C.	I	1906	D
Wood, Jonathan	I	1902	E
Woodbury, W. Sanford	I	1900	E
Woodcock, Eugene C.	II	1907	D
Woodies, Ida A.	IIIb	1900	D
Woodies, Ida A.	P. G. IIIb	1901	D
Woodman, Harry L.	I-III-V	1902	D
Woodruff, Charles B.	V	1906	D
Wright, Edward, Jr.	II	1905	D
Yare, John F.	Vb	1907	E



## LIST OF GRADUATES

- (C) Indicates Certificate, Partial Course.  
 (D) Indicates Diploma, Complete Course.  
 (P. G.) Indicates Post Graduate Course.  
 (x) Indicates Last Known Address.  
 (\*) Deceased.

### Day Course, 1899.

Name	Course	Occupation
Bailey, Joseph W.	I D	Principal, Bradford-Durfee Textile School, Fall River, Mass.
Burrage, Katherine C.	IIIb C	Teacher, Evening Drawing School, Lowell Mass.
Cuttle, James H.	II D	Designer, Harding, Whitman and Co., New York City.
Fels, August B.	II D	Yarn Salesman, New England Cotton Yarn Co., New York City.
Harmon, Charles F.	I D	In business, Lowell, Mass.
*Smith, Albert A.	I D	
Tilton, Elliott T.	II D	Electrician, General Electric Co., Boston, Mass.

### Evening Course, 1899.

*Berry, Frank M.	III C	
Binns, Heaton	II-V C	Foreman, Worsted Dept., Shuttleworth Bros. Co., Amsterdam, N. Y.
Broadbent, James T.	I C	Instructor, Cotton Yarn Dept., Bradford-Durfee Textile School, Fall River, Mass.
Collier, John	III C	Superintendent, American Woolen Company, No. Vassalboro, Me.
Crompton, Henry H.	II C	Instructor, French Spinning, Lowell Textile School, Lowell, Mass.
Gaunt, Alfred C.	III C	Treasurer and Manager, Tremont Worsted Co., Methuen, Mass.
Kellett, Irvine	II C	Second Hand Worsted Spinning, Lower Pacific Mills, Lawrence, Mass.
Marjerison, Isaiah D.	II C	Overseer, Arlington Top Mills, Lawrence, Mass.
McAlister, John W.	V C	With Home Real Estate, Loan and Insurance Co., Winston-Salem, N. C.
Moir, Alexander L.	III C	Letter Carrier, Lowell, Mass.
xNoble, John T.	V C	Bigelow Carpet Co., Lowell, Mass.
Nugent, Thomas A.	II-V C	Overseer Worsted Spinning, Bigelow Carpet Co., Lowell, Mass.
Spedding, Ephraim H.	III C	Second Hand Weaving, Tremont and Suffolk Mills, Lowell, Mass.
xStevenson, Wm.	II C	Supt. Franklin Woolen Mills, Franklin, Ky.
Stopherd, William H.	II-V C	Overseer Worsted Spinning, Bigelow Carpet Co., Lowell, Mass.

Name	Course	Occupation
Swift, Edward S.	V C	Student, Canisius College, Buffalo, N. Y.
Wilmot, William	III C	Designer, Hamilton Webb Co., Hamilton, R. I.
Wilton, George H.	III C	Overseer, M. T. Stevens and Sons Co., No. Andover, Mass.

### Day Course, 1900.

Baldwin, Arthur L.	IV D	Chemist, Lowell, Mass.
Barr, I. Walwin	I D	Designer, Lawrence and Co., New York City.
Bodwell, Henry A.	II D	Supt., Smith and Dove Mfg. Co., Andover, Mass.
Brickett, Chauncey J.	II D	Principal, School of Textiles, International Correspondence School, Scranton, Pa.
Burrage, Katherine C. P. G.	IIIb C	See Day Course, 1899.
Campbell, Laura E.	IIIb C	Designer, Lowell, Mass.
xHarrison, Mrs. Amy H. (Goodhue)	IIIb C	Dracut, Mass.
Lakeman, Fannie S.	IIIb C	Designer, Salem, Mass.
Lamson, George F.	I D	With Hamilton Mfg. Co., Lowell, Mass.
Leach, John P.	I-V C	Foreman, Harriet Cotton Mills, Hender- son, N. C.
Merchant, Edith C.	IIIb C	Designer, Lowell, Mass.
Parker, Harry C.	V C	In business, Franklin, N. H.
Perkins, John E.	III D	Asst. Supt., S. N. and C. Russell Mfg. Co., Pittsfield, Mass.
Pradel, Alois J.	III D	Designer, Montrose Mills, Woonsocket, R. I.
Sleeper, Robert R.	IV D	Instructor in Dyeing, Lowell Textile School, Lowell, Mass.
Smith, Stephen E.	I D	Head instructor, Cotton Dept., Lowell Textile School, Lowell, Mass.
Stewart, Arthur A.	II D	Head Instructor, Finishing, Lowell Tex- tile School, Lowell, Mass.
Syme, James F.	II D	Of H. T. Murdock and Co., Proctorsville, Vt.
Thompson, Henry J.	IV D	Dyer, Boston Rubber Shoe Co., Malden, Mass.
Woodies, Ida A.	IIIb C	Designer, Lowell, Mass.

### Evening Course, 1900.

Campbell, Albert D.	IIb C	Section Hand, Arlington Mills, Lawrence, Mass.
Cawthra, Albert B.	IIb C	Overseer, Moore Spinning Co., North Chelmsford, Mass.
Colby, Arthur D.	I C	Draughtsman, Lowell Machine Shop, Low- ell, Mass.
Donnelly, James	I C	Overseer, Mule Room, Stark Mill No. 6, Manchester, N. H.
Elston, Fred R.	III C	Designer, Puritan Mills, Plymouth, Mass.
Howard, John	V C	Overseer of Weaving, Belvidere Woolen Co., Lowell, Mass.
Hutton, Clarence	V C	Circulation Manager, Lord and Nagle Co., Boston, Mass.

Name	Course	Occupation
Jones, William J.	IIb C	Overseer, Worsted Spinning, U. S. Bunting Co., Lowell, Mass.
Maden, Harry	IIb C	Overseer, Worsted Spinning, Walsh's Mill, Lowell, Mass.
Nelson, Ernest H.	IIb C	Pattern Weaver, Mass. Cotton Mills, Lowell, Mass.
Ogley, Samuel A.	IIb C	Overseer, Worsted Spinning, Brookside Worsted Mills, No. Chelmsford, Mass.
Osgood, Charles F.	I C	Draughtsman, General Electric Company, Lynn, Mass.
*Rowell, Herman C.	I-IIb C	
Silcox, Arthur E.	I C	Draftsman, Lowell Machine Shop, Lowell, Mass.
Snow, Fred L.	IV C	Overseer, Dyeing and Bleaching, Lawrence Mfg. Co., Lowell, Mass.
Wardrobe, Wm. L.	I C	With Mass. Cotton Mills, Lowell, Mass.
xWaterhouse, Joseph	IV C	Section Hand, Merrimack Print Works, Lowell, Mass.
Wing, Charles T.	III C	Designer, Middlesex Mfg. Co., Lowell, Mass.
Woodbury, W. Sanford	I C	Overseer Carding, Orswell Mills, Fitchburg, Mass.

#### Day Course, 1901.

Bradley, Richard H.	V C	Pawtucket, R. I.
Buchan, Donald C.	II D	Asst. Supt., Stevens Mills, Andover, Mass.
Currier, John A.	II D	Asst. Supt., Stevens and Co., Haverhill, Mass.
Ewer, Nathaniel T.	IV D	Chemist, American Dyewood Co., Chester, Pa.
Foster, Clifford E.	II D	Riston, N. Y.
xHarrison, Mrs. Amy H. P.G. (Goodhue)	IIIb C	See Day, 1900.
Kingsbury, Percy F.	IV D	Second Hand, Merrimack Mfg. Co., Lowell, Mass.
Marinel, Walter N.	I D	No. Chelmsford, Mass.
Minge, Jackson C.	I-V C	Sec.-Treas., Minge Mfg. Co., Demopolis, Ala.
Moorhouse, William R.	IV D	Chemist, Cassella Color Co., Boston, Mass.
Parker, B. Moore	I D	Instructor, Carding and Spinning, A. and M. College, West Raleigh, N. C.
Webber, Arthur H.	IV D	Chemist, F. E. Atteaux and Co., Boston, Mass.
Wise, Paul T.	II D	Supt., Worsted Dept., Lymansville Co., Lymansville, R. I.
Woodies, Ida A.	P. G. IIIb C	See Day, 1900.

#### Evening Course, 1901.

Aspinwall, William	IIb C	Section Hand, Drawing, Atlantic Mills, Providence, R. I.
*Berry, Frank M.	V C	
xBrooks, Noah	III-V C	Lowell, Mass.
xBurghardt, Paul C.	IIa C	Second Hand, Card Room, Merrimack Woolen Co., Lowell, Mass.

Name	Course	Occupation
Buzzell, William O.	III C	Second Hand, Weaving, Bristol Mfg. Co., New Bedford, Mass.
Cheetham, John James	III C	Spindle Setter, Mass. Cotton Mills, Lowell, Mass.
Chippindale, Ernest W.	IIb C	Section Hand, Moore Spinning Co., No. Chelmsford, Mass.
Cowdell, Herbert	V C	Loomfixer, Hamilton Mfg. Co., Lowell, Mass.
Davis, Henry	IIb C	Overseer, Carding, Moore Spinning Co., No. Chelmsford, Mass.
xDonovan, Daniel F.	IIa C	Second Hand, Woolen Carding, Yonkers, N. Y.
Evison, William A.	V C	Loomfixer, Mass. Cotton Mills, Lowell, Mass.
Farrell, Thomas	IIa C	Woolen Spinner, Stirling Mills, Lowell, Mass.
xFrame, William	V C	Overseer, Johnson & Johnson, New Brunswick, N. J.
Gagan, John H.	V C	Overseer, Stirling Mills, Lowell, Mass.
Grant, Archibald	IIb C	Section Hand, Spinning, Bigelow Carpet Co., Lowell, Mass.
Groucke, Michael	IIb C	Section Hand, Brussels Dept., Bigelow Carpet Co., Lowell, Mass.
Hill, Daniel	IIb C	Overseer, Worsted Spinning, Maine Alpaca Co., Sanford, Me.
Hitchcock, Thomas B.	I-IIa-III C	Publishing, Grafton Press, New York City.
Holgate, Charles H.	IIa C	Manager, Selmar Hess, New York City.
Hunter, Ralph	III C	Salesman, Hall, Hartwell and Co., Troy, N. Y.
Jones, William J.	IIa C	See Evening, 1900.
Killerby, Walter	IIb C	Overseer, Park Worsted Mill, Lowell, Mass.
Law, Alfred	IIb C	Section Hand, Worsted Combing, Arlington Mills, Lawrence, Mass.
Lord, Wilfred	III C	Inspector, Textile Fabrics, U. S. Government, Boston, Mass.
McQuade, Hugh B.	V C	Lowell, Mass.
Minge, Jackson C.	III C	See Day, 1901.
xMorris, Frank A.	V C	Loomfixer, Standish Worsted Co., Plymouth, Mass.
Nelson, Ernest H.	IIa C	See Evening, 1900.
Noble, John T.	III C	See Evening, 1899.
Peel, Hudson	IIb C	Methuen, Mass.
Reynolds, Hiram L.	III C	Supt., Saunders Cotton Mills, Saundersville, Mass.
xSaunders, Edward B.	III C	In business, Fall River, Mass.
Scanlon, Edward J.	IIb C	In business, Lawrence, Mass.
Shannon, Philip J.	V C	Loomfixer, Belvidere Woolen Mills, Lowell, Mass.
Smith, Fred	IIb C	Supt., Yarn Dept., Wood Worsted Mills, Lawrence, Mass.
Swift, Edward S.	I C	See Evening, 1899.
Wesson, Paul B.	I C	Foreman, Lowell Machine Shop, Lowell, Mass.
Whitehead, Bennett	IIb C	Second Hand, Worsted Spinning, Arlington Mills, Lawrence, Mass.

Name	Course	Occupation
xWilley, Frank S.	I C	Second Hand, Carding, Upper Pacific Mills, Lawrence, Mass.
Williamson, Isaac F.	IV C	Overseer, Hamilton Print Works, Lowell, Mass.

### Day Course, 1902.

Burnham, Frank E.	IV D	Chemist, Avery Chemical Co., Littleton, Mass.
Carter, Robert A.	IV D	Textile chemist and expert, Roessler & Hasslacher Chemical Company, New York City.
Craig, Clarence E.	III D	Auditor, Meriden Creamery Co., Kansas City, Mo.
Curran, Charles E.	II-III-V C	Head Designer, Wood Worsted Mills, Lawrence, Mass.
Ferguson, Arthur F.	I C	Instructor, Design Dept., Lowell Textile School, Lowell, Mass.
Harris, George S.	I C	Supt., Sycamore Mills, Sycamore, Ala.
Haskell, Walter F.	IV D	Overseer of Dyeing, Dana Warp Mills, Westbrook, Me.
Holgate, Benjamin	III C	Cost Accountant, Boott Mills, Lowell, Mass.
Ramsdell, Theodore E.	I D	Agent, Monument Mills, Housatonic, Mass.
Swift, Edward S.	I D	See Evening, 1899 and 1901.
Wing, Charles T.	III D	See Evening, 1900.
Woodman, Harry L.	I-III-V C	Installer, Barber, Coleman Co., Boston, Mass.

### Evening Course, 1902.

xAdams, Wm. R.	IIa C	Pressman, Stevens Mills, No. Andover, Mass.
Barlow, Robert	V C	Twister, Belvidere Woolen Co., Lowell, Mass.
Binns, Heaton	VI C	See Evening, 1899.
Bowring, George P. B.	VI C	Machinist, Lowell Machine Shop, Lowell, Mass.
xBrainerd, Irving L.	I C	Overseer, Carding, W. L. Barrell and Co., Lawrence, Mass.
xBurghardt, Edward S.	IIa C	Lawrence, Mass.
Buzzell, Wm. O.	P. G. III C	See Evening, 1901.
Cheetham, John James	P. G. III C	See Evening, 1901.
Collier, John	P. G. III C	See Evening, 1899.
xCowdrey, Charles E.	V C	Pattern Weaver, Talbot Mills, No. Billerica, Mass.
xCremin, Daniel J.	I C	Second Hand, Boott Mills, Lowell, Mass.
Donnellan, Frank T.	IIa C	Percher, Chicago, Ill.
xDudley, George E.	I C	Third Hand, Carding, Mass. Mills, Lowell, Mass.
Ferguson, Thomas	V C	Second Hand, Appleton Co., Lowell, Mass.
xField, Charles W.	VI C	Draftsman, C. F. Morrill, Somerville, Mass.
xForrest, Fred G.	IIa C	Finishing Room, Middlesex Co., Lowell, Mass.
Fortune, David A.	IIb C	Section Hand, Worsted Spinning, Lower Pacific Mills, Lawrence, Mass.

Name	Course	Occupation
Gaunt, Alfred C.	P. G. III C	See Evening, 1899.
xGood, Henry	I C	Providence, R. I.
xHaigh, Walter	III C	U. S. Bunting Co., Lowell, Mass.
xHaworth, Joseph	VI C	Machinist, Claremont, N. H.
xHogan, James A.	V C	Lowell, Mass.
Hoyle, Edward	IIb C	Asst. Supt., Moore Spinning Co., North Chelmsford, Mass.
Johnson, Ernest A.	IIa-b C	Asst. Supt., Washington Mills, Lawrence, Mass.
Kelley, Michael H.	I C	Second Hand, Appleton Co., Lowell, Mass.
Kent, Ernest J.	IIb C	Section Hand, Worsted Spinning, Lower Pacific Mills, Lawrence, Mass.
Lamont, Walter M.	IIb C	Asst. Agent, Wood Worsted Mill, Lawrence, Mass.
Lawliss, Augustine J.	V C	Overseer Weaving, Belvidere Woolen Co., Lowell, Mass.
Lee, Charles	I C	Machinist, Lowell Machine Shop, Lowell, Mass.
Leith, Edwin E.	III C	Asst. Supt., Thos. Kent Mfg. Co., Clifton Heights, Pa.
Libby, C. Robert	VI C	Draughtsman-Designer, Lamson Consolidated Store Service Co., Lowell, Mass.
Molloy, Andrew	V C	Overseer of Spooling, Tremont and Suffolk Mills, Lowell, Mass.
Nugent, Thomas A.	VI C	See Evening, 1899.
Osgood, Charles F.	VI C	See Evening, 1900.
Potter, Richard W.	V C	Second Hand Weaving, Mass. Cotton Mills, Lowell, Mass.
Rockwell, Samuel F.	IIa C	Supt., Mule Dept., Davis and Furber Machine Co., No. Andover, Mass.
xSchermerhorn, George E.	I C	Overseer, Chas. Chipman's Sons, Easton, Pa.
Smith, Wm. H.	IIb C	Postal Clerk, Postoffice, Lawrence, Mass.
Stevenson, William	III C	See Evening, 1899.
Stopherd, Wm. H.	VI C	See Evening, 1899.
Umpleby, Thomas B.	V C	Manager, J. A. Humphrey and Son, Ltd., Moncton, N. B.
Varney, Manley H.	III C	Overseer, Finishing Dept., Amoskeag Mfg. Co., Manchester, N. H.
Vogt, Alfred H.	III C	Designing Room, George E. Kunhardt, Lawrence, Mass.
Walker, David	III C	Overseer, Burlington Mills, Winooski, Vt.
Wilson, Calvin E.	IIb C	Overseer, Twisting, Cranston Worsted Mills, Bristol, R. I.
Wilson, George H.	IIb C	Section Hand, Lower Pacific Mills, Lawrence, Mass.
Wood, Jonathan	I C	Overseer, Boott Mills, Lowell, Mass.

#### Day Course, 1903.

Bennett, Edward H.	V C	Bus. Mgr., F. P. Bennett and Co., New York City.
Bloom, Wilfred N.	IV D	Asst. Mgr., Read, Holliday and Sons, Ltd., New York City.
Campbell, Louise P.	IIIb C	Designer, Lowell, Mass.
Campbell, Orison S.	II D	With American Felt Co., Dolgeville, N. Y.



Name	Course	Occupation
Chamberlin, Frederick E.	I D	With Monument Mills, Housatonic, Mass.
Emerson, Frank W.	II D	Supt., Moosup Mill, Moosup, Conn.
xEvans, Alfred W.	III D	Arlington Mills, Lawrence, Mass.
xEvans, William R.	III D	Bradford, Mass.
Ferguson, Arthur F.	I D	See Day, 1902.
Fuller, George	I D	Designer, Arnold Print Works, No. Adams, Mass.
Gerrish, Walter	III D	Overseer, Aetna Mills, Watertown, Mass.
Holgate, Benj.	V C	See Day, 1902.
Hutton, Clarence	III C	See Evening, 1900.
Morrison, Fred C.	I D	Clerk, Levi W. Phelps, Ayer, Mass.
Najarian, Garabed	IV D	Overseer of Dyeing, Monument Mills, Housatonic, Mass.
Petty, George E.	I-V C	In business, Greensboro, N. C.
Pradel, Mrs. A. J. (Walker)	IIIb C	Woonsocket, R. I.
*Rasche, Wm. A.	III D	
Reynolds, Isabel H.	III-V C	Asst. to Designer, Arlington Mills, Lawrence, Mass.
xRobinson, Wm. C.	III-V C	With Russell Mfg. Co., Middletown, Conn.
Snelling, Fred N.	II D	With American Express Co., Haverhill, Mass.
xSpiegel, Edward	V C	In business, New York City.
Stevenson, Murray R.	III-V C	Pasadena, Cal.
Stewart, Walter L.	III D	Designer, Clarence Whitman and Company, New York City.
Wilson, John S.	II D	Designer, U. S. Bunting Co., Lowell, Mass.

### Evening Course, 1903.

Adams, Henry S.	IIa C	Purchasing Agent, Union Buffalo Mills Co., Union, S. C.
Balmforth, James H.	IIa C	Clerk, P. O., Bloomfield, N. J.
Barry, Edward J.	III C	Overseer, Weaving, Jackson Mfg. Company, Nashua, N. H.
Bastow, Henry	III C	Warp Dresser, Arlington Mills, Lawrence, Mass.
Baxter, Alvah J.	IIa C	Clerk, Wood Worsted Mills, Lawrence, Mass.
Byam, Walter S.	VI C	Draftsman, Lowell Machine Shop, Lowell, Mass.
Cady, Dennis J.	V C	Loomfixer, Arlington Mills, Lawrence, Mass.
Donnellan, Frank T.	V C	See Evening, 1902.
Flynn, John J.	VI C	Bookkeeper, Coffey Bros., Lowell, Mass.
French, Mrs. Martha B. (Balmforth)	III C	Tewksbury Mass.
xGarner, William	III C	Foreman of Refinery, Warren Bros. Co., Washington, D. C.
Gaunt, Alfred C.	IIa C	See Evening, 1899.
Goodchild, George	I C	Draftsman, Lowell Machine Shop, Lowell, Mass.
xGray, Finley M.	VI C	Machinist, Lowell Machine Shop, Lowell, Mass.
xHiggins, James A.	IIa C	Spinner, Talbot Mills, No. Billerica, Mass.

Name	Course	Occupation
Howard, John	III C	See Evening, 1900.
Hunter, Ralph	V C	See Evening, 1901.
Jennings, James J.	III C	Designer, Lyman Mills, Holyoke, Mass.
Johnson, Samuel L.	V C	Second Hand Weaving, Arlington Mills, Lawrence, Mass.
Keleher, John J.	IIb C	Section Hand, Worsted Spinning, Crescent Worsted Mills, Lawrence, Mass.
Knowles, Frank E.	I C	Overseer, Tremont and Suffolk Mills, Lowell, Mass.
xLawrence, Charles	I C	Overseer Mule Spinning, Dartmouth Corp., New Bedford, Mass.
Leach, Joseph W.	V C	Designer, Pacific Mills, Lawrence, Mass.
Lincourt, Hector L.	VI C	Machinist and Draftsman, Rowland Graphite Co., Lowell, Mass.
Lord, Wilfred	IIb C	See Evening, 1901.
xMason, Frederick A.	I C	Mule Spinner, Saxony Worsted Mills, Newton, Mass.
Moir, Alexander L.	P. G. III C	See Evening, 1899.
Mortenson, Carl W.	III C	Paymaster, Talbot Mills, No. Billerica, Mass.
*Mozley, Arthur	VI C	
Myers, James W.	III-IV C	Clerk, U. S. Bunting Co., Lowell, Mass.
Nicholson, Richard	IIb C	Section Hand, Washington Mills, Lawrence, Mass.
Noonan, Denis T.	III C	Asst. Supt., Knoxville Woolen Mills, Knoxville, Tenn.
xPalmer, G. Buel	III C	Lowell, Mass.
Rockwell, Henry D.	IIa C	Clerk, Davis and Furber Machine Co., No. Andover, Mass.
Schofield, John S.	III C	Pattern Weaver, Kunhardt's Mill, Lawrence, Mass.
Schoon, Fenton	IIb C	Section Hand, Worsted Drawing, Lower Pacific Mills, Lawrence, Mass.
Stokham, Burton I.	IV C	Asst. Chemist, Bigelow Carpet Co., Lowell, Mass.
xTonge, Matthew	III C	Weaver, Dartmouth Mfg. Co., New Bedford, Mass.
Upton, Frank A.	I C	Carder, L. E. Palmer Co., Middletown, Conn.
Varney, Manley H.	I C	See Evening, 1902.
Walker, David	P. G. III C	See Evening, 1902.

#### Day Course, 1904.

Abbott, Edward M.	II D	With Abbott Worsted Co., Graniteville, Mass.
Baldwin, Frederick A.	II D	With Walter Blue and Co., Ltd., Sherbrooke, P. Q., Canada.
Clapp, F. Austin	II D	Asst. to Manager, Earncliffe Worsted Mills, New York City.
Clogston, Raymond B.	IV D	Associate Dyer, Arnold Print Works, No. Adams, Mass.
Culver, Ralph F.	IV D	Foreman Dyer, Arnold Print Works, No. Adams, Mass.
Cutler, Benj. W., Jr.	III D	With W. H. Hinchman and Co., New York City.

Name	Course	Occupation
Dewey, James F.	II D	Supt., Dewey's Mills, Quechee, Vt.
Donald, Albert E.	II D	With Atlas Linen Co., Meredith, N. H.
xHalsell, Elam R.	I C	With Appleton Mills, Lowell, Mass.
xHorsfall, George G.	II-III-V C	Asst. Designer, Martinsburg Worsted and Cassimere Co., Martinsburg, W. Va.
Jones, Everett A.	II C	With Nye and Wait Carpet Co., Auburn, N. Y.
Jury, Alfred E.	IV D	Chemist, Wells, Richardson and Co., Burlington, Vt.
Lucey, Edmund A.	II D	With Smith and Dove Mfg. Co., Andover, Mass.
MacPherson, Wallace A.	III D	Asst. Designer, National and Providence Worsted Mills, Providence, R. I.
Meadows, Wm. R.	I D	Teaching Director, Miss. Textile School, Agricultural College, Miss.
O'Donnell, John D.	I C	Clerk, Travers Bros. Co., New York City.
O'Hara, Wm. F.	IV C	Lowell, Mass.
Parker, Everett N.	I C	With Parker Bobbin Co., Lowell, Mass.
Smith, Ralston, F.	I C	Secretary, Davies Printing Co., Cleveland, Ohio.
Stevens, Dexter	I D	Yarn Supt., Lancaster Mills, Clinton, Mass.
Toovey, Sidney E.	V C	With Talbot Mills, No. Billerica, Mass.
Webb, Frank H.	IV D	Asst. Chemist, American Woolen Co., Lawrence, Mass.
White, Royal P.	II D	Supt., Stirling Mills, Lowell, Mass.
Wilson, Walter E. H.	I C	Machinist, D. H. Wilson and Co., Lowell, Mass.

#### Evening Course, 1904.

Adams, Michael E.	VI C	Bookkeeper, National Biscuit Co., Lowell, Mass.
Balmforth, James H.	IIa-b C	See Evening, 1903.
Balmforth, Wm. F.	VI C	No. Billerica, Mass.
xBarker, John P.	V C	Peacedale, R. I.
Barrington, John A.	IV C	With Kalle and Co., Boston, Mass.
xBoucher, John L.	VI C	Lowell, Mass.
xButler, Benj. O.	VI C	Lowell, Mass.
xCallahan, Patrick A.	VI C	With Lower Pacific Mills, Lawrence, Mass.
xCheetham, John Joseph	I C	Asst. Second Hand, Mass. Cotton Mills, Lowell, Mass.
xConley, Frederick A.	VI C	Machinist, Kitson Machine Co., Lowell, Mass.
Connors, Edward F.	VI C	Draftsman, Locks and Canals, Lowell, Mass.
Davis, Prentice T.	I C	Bookkeeper, O. P. Davis, Lowell, Mass.
Delmage, Edward R.	III C	Overseer Weaving and Asst. Supt., Thos. Kent Mfg. Co., Clifton Heights, Pa.
xDempsey, John W.	IIa C	Spinner, Bigelow Carpet Co., Lowell, Mass.
xDonahue, Michael F.	VI C	Boston, Mass.
Doole, George L.	VI C	Weaver, U. S. Bunting Co., Lowell, Mass.
Dooley, Edward W.	VI C	With Spencer and Co., Lowell, Mass.
Duggan, Francis P.	VI C	Second Hand, U. S. Cartridge Co., Lowell, Mass.

Name	Course	Occupation
Frank, Emil M.	III C	Asst. Designer, Arlington Mills, Lawrence, Mass.
Gaunt, Alfred C.	IIb C	See Evening, 1899.
Hempel, Frank	V C	Room Hand, Washington Mills, Lawrence, Mass.
Higgins, James A.	IIa-b C	See Evening, 1903.
Hoyle, Joseph	IIb C	Section Hand, Moore Spinning Co., No. Chelmsford, Mass.
Jeannotte, Arthur	VI C	Carpet Finishing, Bigelow Carpet Co., Lowell, Mass.
xKershaw, Wm. E.	V C	Weaver, Talbot Mills, No. Billerica, Mass.
Langevin, Felix D.	VI C	Asst. Supt., Kitson Machine Co., Lowell, Mass.
xLord, Harry D.	III C	Lowell, Mass.
Lord, Wilfred	IIa C	See Evening, 1901.
xMcBride, Robert G.	IIa C	Mule fixer, Merrimack Woolen Mills, Lowell, Mass.
Merrill, Edwin C.	VI C	Draftsman, Eng. Dept., City Hall, Lawrence, Mass.
Miller, Emil H.	V C	With Lower Pacific Mills, Lawrence, Mass.
Moorehouse, Thomas	VI C	Lawrence, Mass.
Murphy, John H.	VI C	Clerk, City of Lowell, Lowell, Mass.
Notman, Frederick W.	I C	Clerk, Mass. Cotton Mills, Boston, Mass.
Patrick, Alexander	III C	Omaha, Neb.
Redman, Henry S.	III C	Clerk, Appleton Co., Lowell, Mass.
xReed, Foster C. K.	VI C	Steam Engineer, Farwell Bleachery, Lawrence, Mass.
Rhodes, Joseph E.	V C	Wire Sharpener, Mass. Mohair Plush Co., Lowell, Mass.
Rooney, George W.	I C	Overseer, N. H. Spinning Mill, Penacook, N. H.
xShaw, James	V C	Weaver, Plush Mill, Lowell, Mass.
Smith, Edward	I C	Overseer Carding, Boott Mills, Lowell, Mass.
Smith, John W.	IIb C	Section Hand, Arlington Mills, Lawrence, Mass.
xSterling, Walter	III C	New Bedford, Mass.
Stokham, Burton I.	P. G. IV C	See Evening, 1903.
xTarpey, John F.	IIa C	With Merrimack Mfg. Co., Lowell, Mass.
Thompson, Charles B.	VI C	Clerk, B. and M. Railroad, Lowell, Mass.
xWebb, Francis H.	V C	Quiller, Mass. Mohair Plush Co., Lowell, Mass.

#### Day Course, 1905.

Adams, Henry S.	I D	See Evening, 1903.
Arundale, Henry B.	II-III-V C	Lawrence, Mass.
Boyd, George A.	I D	Office Mgr., Chicopee Mfg. Co., Chicopee Falls, Mass.
Carr, George E.	I D	Foreman, Mending Dept., Wyoming Valley Lace Mills, Wilkesbarre, Pa.
Cole, James T.	II D	Overseer of Linen and Rug Mfg., Mass. Commission for Adult Blind, Cambridge, Mass.
Conklin, Jennie G.	IIIb C	Commercial Designer, Boston, Mass.

Name	Course	Occupation
Curtis, Wm. L.	II C	Clerk, Parker, Wilder and Co., Boston, Mass.
Dillon, James H.	III D	Library Bureau, Boston, Mass.
Harris, Charles E.	I D	Agent, West Boylston Mfg. Co., East-hampton, Mass.
Hollings, James L.	I D	Designer, American Mills Co., Waterbury, Conn.
Hook, Russell W.	IV D	Instructor, Dyeing, Lowell Textile School, Lowell, Mass.
Hunt, Chester L.	III C	Sample Dresser and Weaver, Peacedale Mfg. Co., Peacedale, R. I.
Jones, Everett A.	III D	See Day, 1904.
Lee, Wm. H.	V C	Overseer, Farr Alpaca Co., Holyoke, Mass.
Lewis, Walter S.	IV D	Paper and Textile Expert, Bureau of Stand-ards, Washington, D. C.
McKenna, Hugh F.	IV D	Color Chemist, United Indigo and Chemi-cal Co., Ltd., Boston, Mass.
Midwood, Arnold J.	IV D	Chemist, Levinstein and Co., Boston, Mass.
Moore, Everett B.	I D	With Chadbourne and Moore, Chelsea, Mass.
Parker, Everett N.	I D	See Day, 1904.
xRoberson, Pat H.	I C	Lowell, Mass.
Roberts, Carrie I.	IIIb C	Designer, Lowell, Mass.
xThomas, Roland V.	I C	Lowell, Mass.
Thompson, Everett L.	I D	With Brown, Durrell and Co., Boston, Mass.
Warren, Philip H.	II D	With Puritan Mills, Plymouth, Mass.
Wheelock, Stanley H.	II D	Supt., Stanley Woolen Co., Uxbridge, Mass.
Wright, Edward, Jr.	II C	Asst. in Engineering Dept., State Board of Health, Boston, Mass.

### Evening Course, 1905.

Bake, Herbert	III C	Asst. Designer, Walworth Bros., Law-rence, Mass.
Bastow, Henry	V C	See Evening, 1903.
xBell, Frederick W.	IIa C	Spinner, Stirling Mills, Lowell, Mass.
Bowie, Samuel A.	VI C	Engineer, Pacific Mills, Lawrence, Mass.
xBrown, James P.	III C	Pilling Shoe Shop, Lowell, Mass.
Bryant, Ernest L.	VI C	Waterbury, Conn.
xBurke, Thomas F.	I C	Lowell, Mass.
Burns, Edward J.	IV C	Tester, U. S. Cartridge Co., Lowell, Mass.
Burns, James E.	IV C	Chemist, U. S. Cartridge Co., Lowell, Mass.
xCaron, Cleophas	I C	Second Hand, Spinning Dept., Queen City Cotton Co., Burlington, Vt.
Collins, John A.	IIa-b C	With Arkwright Mutual Fire Ins. Co., Boston, Mass.
Cook, Cheney E.	III C	With Winslow Bros. and Smith Co., Nor-wood, Mass.
Custer, James J. E.	V C	Lowell, Mass.
Dana, Clarence A.	VI C	Draftsman, Lowell Machine Shop, Lowell, Mass.

Name	Course	Occupation
Dick, Hugo P.	III C	Loomfixer, Lower Pacific Mills, Lawrence, Mass.
Dimlick, Benj. C.	III C	Cloth Examiner, Wood Worsted Mills, Lawrence, Mass.
Erbe, Gustave	VI C	Machinist, J. L. Thompson Mfg. Co., Lawrence, Mass.
Foster, Sherwood L.	I C	Chief Clerk, Gen. Electric Co., Boston, Mass.
xFrench, Ernest J.	I C	Clerk, Upper Pacific Mills, Lawrence, Mass.
Gay, Earle B.	I C	Second Hand Carding, Dana Warp Mills, Westbrook, Me.
Goodchild, George	VI C	See Evening, 1903.
Harder, Elmer E.	VI C	Janitor, Highland School, Lowell, Mass.
Haven, George W.	III C	Of Blake and Stearns, Boston, Mass.
Howard, Thomas	V C	Overseer, T. Martin and Bro. Mfg. Co., Lowell, Mass.
xHunt, Herbert R.	VI C	Asst. Chief Draftsman, DeLamar's Copper Refining Co., Chrome, N. J.
Hunton, Lewis G.	IV C	In business, Lowell, Mass.
Kenworthy, Joseph	I C	Second Hand, Mass. Mfg. Co., Lowell, Mass.
Kimball, Irving D.	VI C	Patent Dept., Lowell Machine Shop, Lowell, Mass.
Lamson, George F.	VI C	See Day, 1900.
Linkletter, Alfred C.	VI C	Steamfitter, H. R. Barker Mfg. Co., Lowell, Mass.
xLovell, Charles E.	VI C	Los Angeles, Cal.
Maguire, James H.	VI C	Machine Erector, Lowell Machine Shop, Lowell, Mass.
Martin, John C., Jr.	IIa-b C	Tailor, J. C. Martin, Lowell, Mass.
McManus, Hugh	V C	With Middlesex Co., Lowell, Mass.
Molloy, Andrew	III C	See Evening, 1902.
O'Neill, Peter F.	IV C	Overseer, Warp Dyeing, Arlington Mills, Lawrence, Mass.
xOverend, John	V C	Hand Dresser, Arlington Mills, Lawrence, See Evening, 1904.
Redman, Henry S.	V C	See Evening, 1904.
Silk, Frederick C. M.	IV C	Asst. Colorist, Bigelow Carpet Co., Lowell, Mass.
Simola, Emil J.	IIa-b C	Finland.
Skinner, Clarence W.	III C	With Brightwood Mfg. Co., No. Andover, Mass.
Smith, Arthur	III C	Designing, Pemberton Mills, Lawrence, Mass.
Smith, George A.	III C	Overseer and Asst. Designer, Tremont Worsted Co., Methuen, Mass.
Smith, Wm. E.	III C	Lawrence, Mass.
Stevens, Frank W.	VI C	Draftsman, Locks and Canals, Lowell, Mass.
Stopherd, Wm. H.	III C	See Evening, 1899.
Tonge, John	IV C	With Dana Warp Mills, Westbrook, Me.
Wilde, Thomas E.	IIa C	Stenographer, Jeremiah Clark Machine Co., Lowell, Mass.
Wiswall, Frank T.	V C	Storekeeper and Receiving Clerk, George E. Kunhardt's Mill, Lawrence, Mass.



### Day Course, 1906.

Name	Course	Occupation
Avery, Charles H.	II D	With Strong, Hewat and Co., No. Adams, Mass.
Bradford, Roy H.	II D	Asst. Supt., Smith and Dove Mfg. Co., Andover, Mass.
Church, Charles R.	II-V C	Lowell, Mass.
Churchill, Charles W.	III D	Treasurer, J. Harriman Narrow Fabric Co., Lowell, Mass.
Cole, Edward E.	IV D	Bradford, Mass.
Currier, Herbert A.	I D	With Deering, Milliken and Co., New York City.
Curtis, Frank M.	I D	With Geo. W. Curtis Lumber Co., Boston, Mass.
Fleming, Frank E.	IV D	Second Hand in Dyehouse, Goodall Worsted Co., Sanford, Me.
Gahm, George L.	II D	With Wood Worsted Mills, Lawrence, Mass.
Gillon, Sara A.	IIIb C	Designer, Lowell, Mass.
Hennigan, Arthur J.	II D	With The Noera Flannel and Woolen Mills, Boston, Mass.
Hildreth, Harold W.	II-V C	With Arlington Mills, Lawrence, Mass.
Hintze, Thomas F.	I C	Asst. Supt., Commercial Twine Company, New York City.
Kent, Clarence L.	III-V C	In business, Bay State Loan Co., Lawrence, Mass.
Lane, John W.	I C	Section Hand, Everett Mills, Lawrence, Mass.
McDonnell, William H.	I-V C	South Boston, Mass.
Newcomb, Guy H.	IV C	With The Badiscat Co., San Francisco, Cal.
Reynolds, Isabel H.	P. G. III-V C	See Day, 1903.
Stohn, Alexander C.	III-V C	Cloth Inspector, C. Stohn, Jamaica Plain, Mass.
Swan, Guy C.	II D	With Swan and Berndtson, Lawrence, Mass.
Varnum, Arthur C.	II D	With Talbot Mills, No. Billerica, Mass.
Wightman, William H.	IV D	Traveling Salesman, Farbenfabriken of Elberfeld Co., Boston, Mass.
Wood, Herbert C.	I D	Second Hand, Tremont and Suffolk Mills, Lowell, Mass.
Woodruff, Charles B.	V C	With Goodall, Brown and Co., Birmingham, Ala.

### Evening Course, 1906.

Abbott, Paul W.	I C	Asst. Foreman, Screw Machine Dept., Lowell Mathine Shop, Lowell, Mass.
Amiot, Louis H.	Va C	Lowell, Mass.
Armstrong, Elias B.	Iib C	With Joy, Langdon and Co., Boston, Mass.
Bake, Herbert	P. G. III C	See Evening, 1905.
Brouder, John J.	III C	Asst. Designer, Wood Worsted Mills, Lawrence, Mass.
Brown, James P.	P. G. III C	See Evening, 1905.

Name	Course	Occupation
Brown, Wm. G.	IIb C	President, Geo. C. Moore Wool Scouring Mills and Brookside Worsted Mills, No. Chelmsford, Mass.
Burgess, Joseph H.	Va C	Pattern Weaver, Pemberton Mills, Lawrence, Mass.
Burnham, Joseph W.	III C	Asst. Designer, Puritan Mills, Plymouth, Mass.
Burnham, Wilmont V.	Vb C	With Wood Worsted Mills, Lawrence, Mass.
Dick, Hugo P.	P. G. III C	See Evening, 1905.
xDickson, Andrew	IIa C	Asst. Shipping Clerk, Coronet Worsted Co., Mapleville, R. I.
Dimlick, Benj. C.	P. G. III C	See Evening, 1905.
Dodge, Frank	I C	Second Hand, Hamilton Co., Lowell, Mass.
Duce, Benj.	III C	Overseer Weaving, Brightwood Mfg. Co., No. Andover, Mass.
Ellis, George W.	VII C	With D. W. Ellis and Son, Monson, Mass.
Eyers, John T.	IV C	Wet Finisher, Bound Brook Woolen Co., Bound Brook, N. Y.
Frank, Emil M.	P. G. III C	See Evening, 1904.
xFulton, John M.	V C	Lowell Bleachery, Lowell, Mass.
Gregson, Robert B.	Va C	Third Hand, Combining Room, Hamilton Mfg. Co., Lowell, Mass.
xHaigh, Wm.	Vb C	Boott Mills, Lowell, Mass.
xHartwell, Henry E.	VI C	Engineer, Washington Mills, Lawrence, Mass.
Hoessler, Carl, Jr.	III C	Loomfixer, Arlington Mills, Lawrence, Mass.
Howard, John	IIa C	See Evening, 1900.
xHutton, Harold	V C	With N. E. Bunting Co., Lowell, Mass.
xHutton, John M.	Vb C	With N. E. Bunting Co., Lowell, Mass.
xInberg, Magnus	I C	Fitchburg, Mass.
Johnson, Ernest A.	V C	See Evening, 1902.
Kidd, Thomas E.	IV C	Cable Inspector, N. E. Telephone Co., Boston, Mass.
Laffert, August W.	III C	Loomfixer, Wood Worsted Mills, Lawrence, Mass.
Maguire, James H.	I C	See Evening, 1905.
McCarthy, Joseph F.	III C	Lawrence, Mass.
xMcLaughlin, Peter J.	I C	Second Hand, Mass. Cotton Mills, Lowell, Mass.
McLay, John	Vb C	Washington Mills, Lawrence, Mass.
Michelmores, Harry	III C	Asst. Designer, Brightwood Mfg. Co., No. Andover, Mass.
Molloy, Andrew	P. G. III C	See Evening, 1902.
Morton, Albert N.	IIb C	At Kitson Machine Shop, Lowell, Mass.
Murphy, Cornelius D.	IIa C	Second Hand, N. E. Bunting Co., Lowell, Mass.
Nelson, Ernest H.	III C	See Evening, 1900.
O'Brien, David A.	IV C	With Carleton and Hovey, Lowell, Mass.
Pedler, Wm. A.	I C	Clerk, Cotton Dept., Arlington Mills, Lawrence, Mass.
Pihl, Christian E.	VI C	Overseer Yard, Appleton Mills, Lowell, Mass.
xPittendreigh, John M.	I C	Third Hand, Merrimack Mill, Lowell, Mass.

Name	Course	Occupation
Reardon, Timothy H.	VI C	With Gen. Electric Co., Lynn, Mass.
Reynolds, Eugene A.	VI C	With Lawrence Mfg. Co., Lowell, Mass.
Richards, Francis G.	IIa C	Wool Sorter, Arlington Mills, Lawrence, Mass.
Rushworth, Walter	VI C	Electrician, Godfrey Electric Construction Co., Lowell, Mass.
Schubert, George J.	V C	Second Hand, Pemberton Co., Lawrence, Mass.
Senior, George	Va C	Stenographer and Bookkeeper, Hamilton Mfg. Co., Lowell, Mass.
Sharpe, John R.	VI C	Overseer, Lowell Machine Shop, Lowell, Mass.
Sheppard, Byron H.	VI C	Draftsman, C. R. Makepeace and Company, Providence, R. I.
Silk, Patrick E.	VII C	Overseer, Carpet Finishing, Westboro Mills, Westboro, Mass.
Skinner, Clarence W.	P. G. III C	See Evening, 1905.
Smith, Arthur	P. G. III C Va C	See Evening, 1905.
Smith, George A.	P. G. III C	See Evening, 1905.
Smith, Wm. E.	P. G. III C	See Evening, 1905.
Stopherd, Wm. H.	P. G. III C	See Evening, 1899.
Vogt, Harry A.	Vb C	Loomfixer, Wood Worsted Mills, Lawrence, Mass.
Walker, Wm., Jr.	VII C	Asst. to Supt., Ottaqueeche Woolen Co., No. Hartland, Vt.
Ward, James J.	VII C	With U. S. Bunting Co., Lowell, Mass.
*Whitcomb, Harry E.	I C	

### Day Course, 1907.

Arundale, Henry B.	II D	See Day, 1905.
Brannen, Leon V.	III-V C	Philadelphia, Pa.
Coman, James G.	I D	Instructor, Cotton Yarns, Lowell Textile School, Lowell, Mass.
Craig, Albert W.	IV D	Color Chemist, Arthur Merritt, Boston, Mass.
Ehrenfried, Jacob B.	II-V C	With Racine Woolen Mills, Racine, Wis.
Farmer, Chester J.	IV D	Student, Harvard Medical School, Cambridge, Mass.
Haskell, Spencer H.	II D	Worcester, Mass.
Hathorn, George W.	IV D	Asst. Chemist, N. E. Gas and Coke Co., Everett, Mass.
Hildreth, Harold W.	II D	See Day, 1906.
Hoyt, Charles W. H.	IV D	With Farbenfabriken of Elberfeld Co., Boston, Mass.
Knowland, Daniel P.	IV D	Chemist, Cassella Color Co., Boston, Mass.
Lane, John W.	I-V C	See Day, 1906.
Mackay, Stewart	III D	Instructor, Hand Loom Weaving, Lowell Textile School, Lowell, Mass.
Meek, Lotta	IIIb C	Lowell, Mass.
Merriman, Earl C.	II D	Shirley, Mass.
Raymond, Charles A.	IV D	Chemist, N. E. Gas and Coke Company, Everett, Mass.
Storer, Francis E.	II D	With F. E. Atteaux and Co., Boston, Mass.

Name	Course	Occupation
Stursberg, Paul W.	II D	With Germania Mills, Holyoke, Mass.
Woodcock, Eugene C.	II D	Instructor, Woolen Yarns, Lowell Textile School, Lowell, Mass.

### Evening Course, 1907.

Ackroyd, Theodore C.	I Ib C	Chicago, Ill.
Bain, William A.	VII C	Overseer, Dyeing, Priscilla Woolen Co., Spencer, Mass.
Bake, Herbert	VII C	See Evening, 1905.
Ballinger, Frederick W.	I Ib C	With Moore Spinning Co., No. Chelmsford, Mass.
Barber, James E.	I Ib C	Combing Fixer, Moore Spinning Co., No. Chelmsford, Mass.
Barraclough, John C.	I C	Clerk, Arlington Mills, Lawrence, Mass.
Bastow, Stephen W.	IV C	Second Hand, Dyehouse, Nashua Mfg. Co., Nashua, N. H.
Bayard, Pierre P.	III C	South Bend, Ind.
Begen, Thomas W.	I Ib C	Overseer, Washington Mills, Lawrence, Mass.
Benoit, William A.	Va C	Loom Fixer, Lower Pacific Mills, Lawrence, Mass.
Bouille, Arthur L.	Vb C	Washington Mills, Lawrence, Mass.
Brannen, Leon V.	IIa C	See Day, 1907.
Brouder, John J.	VII C	See Evening, 1906.
Bucklitsch, Gustave J.	I Ib C	Section Hand, Washington Mills, Lawrence, Mass.
Burgess, Joseph H.	Vb C	See Evening, 1906.
Butterworth, Charles A.	Va C	Loom Fixer, Mass. Mills, Lowell, Mass.
Butterworth, John A.	I Ib C	Section Hand, Washington Mills, Lawrence, Mass.
Carden, Francis E.	I Ib C	Lowell, Mass.
Carlson, Ernest B.	I Ib C	West Chelmsford, Mass.
Dick, Hugo P.	I Ib C	See Evening, 1905.
Dobbs, Willie	I Ib C	Section Hand, Mass. Mohair Plush Co., Lowell, Mass.
Dodge, Charles P.	IIa C	Machinist, C. S. Dodge, Lowell, Mass.
Duce, Benjamin	VII C	See Evening, 1906.
Flint, Leon G.	III C	Percher, Washington Mills, Lawrence, Mass.
Frechette, Alphonse J.	I Ib C	Section Hand, Lower Pacific Mills, Lawrence, Mass.
Gillespie, James E.	VII C	Wet Finishing, Brightwood Mfg. Company, No. Andover, Mass.
Gregson, Robert B.	I-Vc C	See Evening, 1906.
Haartz, John C.	VII C	Of W. A. and J. C. Haartz, Boston, Mass.
xHaas, Ignatius	I C	Philadelphia, Pa.
Hamblett, Harry A.	I C	Second Hand, Merrimack Mfg. Co., Lowell, Mass.
Hanglin, Albert J.	IV C	With American Hide and Leather Co., Lowell, Mass.
Hanglin, William E.	Vb C	Worcester, Mass.
Hebert, Charles L. J.	IV C	Lowell, Mass.
Hitchen, Harry S.	Vb C	Belvidere Woolen Mills, Lowell, Mass.
Hitchen, Thomas G.	Vb C	Belvidere Woolen Mills, Lowell, Mass.
Howard, John	VII C	See Evening, 1900.

Name	Course	Occupation
Ignatius, Pentti	Va C	Appleton Co., Lowell, Mass.
Jepson, Harry	Vb C	With U. S. Bunting Co., Lowell, Mass.
Kelley, Michael H.	III C	See Evening, 1902.
Kirsch, Alfred O.	Vb C	Washington Mills, Lowell, Mass.
Laffert, August W.	VII C	See Evening, 1906.
Lake, William F.	III C	Asst. Designer, Middlesex Co., Lowell, Mass.
Marjerison, T. Sydney	III C	Clerk, Lower Pacific Mills, Lawrence, Mass.
Martin, Willard E.	III C	With Joy, Langdon and Co., Boston, Mass.
Micheltmore, Harry	VII C	See Evening, 1906.
Myers, James W.	VII C	See Evening, 1903.
Nelson, Charles E.	IIb C	West Chelmsford, Mass.
xO'Brien, Michael F.	IIb C	Bigelow Carpet Co., Lowell, Mass.
Porter, George K., Jr.	III C	With Joy, Langdon and Co., Boston, Mass.
Read, Paul A.	VII C	Mass. Cotton Mills, Lowell, Mass.
Redman, Henry S.	I C	See Evening, 1904.
Ritter, Alfred E.	IIb C	Lawrence, Mass.
Robbins, John	IIb C	With Moore Spinning Co., No. Chelmsford, Mass.
Senior, George	I-Vc C	See Evening, 1906.
Skinner, Clarence W.	VII C	See Evening, 1905.
Smith, Arthur	Vc C	See Evening, 1905.
Smith, Ernest B.	Vb C	With American Woolen Co., Lawrence, Mass.
Smith, James	Vb C	Loom Fixer, Wood Worsted Mills, Lawrence, Mass.
Smith, Percy H.	Vb C	Washington Mills, Lawrence, Mass.
Smith, William E.	VII C	See Evening, 1905.
Varnum, Arthur C.	Vb C	See Day, 1906.
Waterworth, Frank W.	Vb C	Second Hand, Washington Mills, Lawrence, Mass.
Webb, Francis H.	III C	See Evening, 1904.
Webber, John F.	III C	Designer, Joy, Langdon and Co., Boston, Mass.
Wahlberg, Einar S.	I C	Fitchburg, Mass.
Whittaker, Thomas	IIb C	Bookkeeper, Arlington Mills, Lawrence, Mass.
Wiggin, Leon M.	III C	Middlesex Mills, Lowell, Mass.
Wolf, William C.	Va C	Loom Fixer, Pacific Mills, Lawrence, Mass.
xWolger, John J.	III C	Loom Fixer, Methuen Co., Methuen, Mass.
Yare, John F.	Vb C	Middlesex Co., Lowell, Mass.

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( DAY )

FILL OUT AND SEND TO PRINCIPAL

# Lowell Textile School

LOWELL, MASS.

## APPLICATION BLANK

Date.....

I,.....hereby  
apply for admission to the Lowell Textile School as DAY  
student.

Name in Full, .....

Date and Place of Birth, .....

Home Residence, .....

Parent or Guardian, .....

Residence of Parent or Guardian, .....

School last attended, .....

( INDICATE COURSE )

- |                          |                           |
|--------------------------|---------------------------|
| I. Cotton Manufacturing. | II. Wool Manufacturing.   |
| III. Textile Designing.  | IV. Chemistry and Dyeing. |
| VI. Textile Engineering. |                           |

Signature, .....

ENDORSEMENT BY OFFICER OF SCHOOL LAST ATTENDED

I hereby certify that.....  
the above applicant has completed the regular four years  
course at the.....High School.

Signed : .....

Principal ..... School, located  
at.....State of .....

Date.....

FORM FOR EVENING CLASSES ON OTHER SIDE

( EVENING )

FILL OUT AND SEND TO PRINCIPAL

# Lowell Textile School

LOWELL, MASS.

## APPLICATION BLANK

DATE.....

I, ..... hereby  
apply for admission to the Lowell Textile School as *EVENING*  
student.

Name in Full, .....

Date and Place of Birth, .....

Home Residence, .....

Parent or Guardian, .....

Residence of Parent or Guardian, .....

School last attended, .....

( INDICATE COURSE )

I. Cotton Spinning.

V. Weaving.

a—Cotton Weaving.

II. a—Woolen Spinning.

b—Woolen and Worsted Weaving.

b—Worsted Spinning.

c—Dobby and Jacquard Weaving.

VI. Engineering

III. Designing.

a—Mechanics and Electricity

b—Mechanical Drawing.

c—Architectural Drawing.

IV. Chemistry and Dyeing.

VII. Woolen and Worsted Finishing.

Signature, .....

ENDORSEMENT BY SOME OFFICER OF SCHOOL LAST ATTENDED

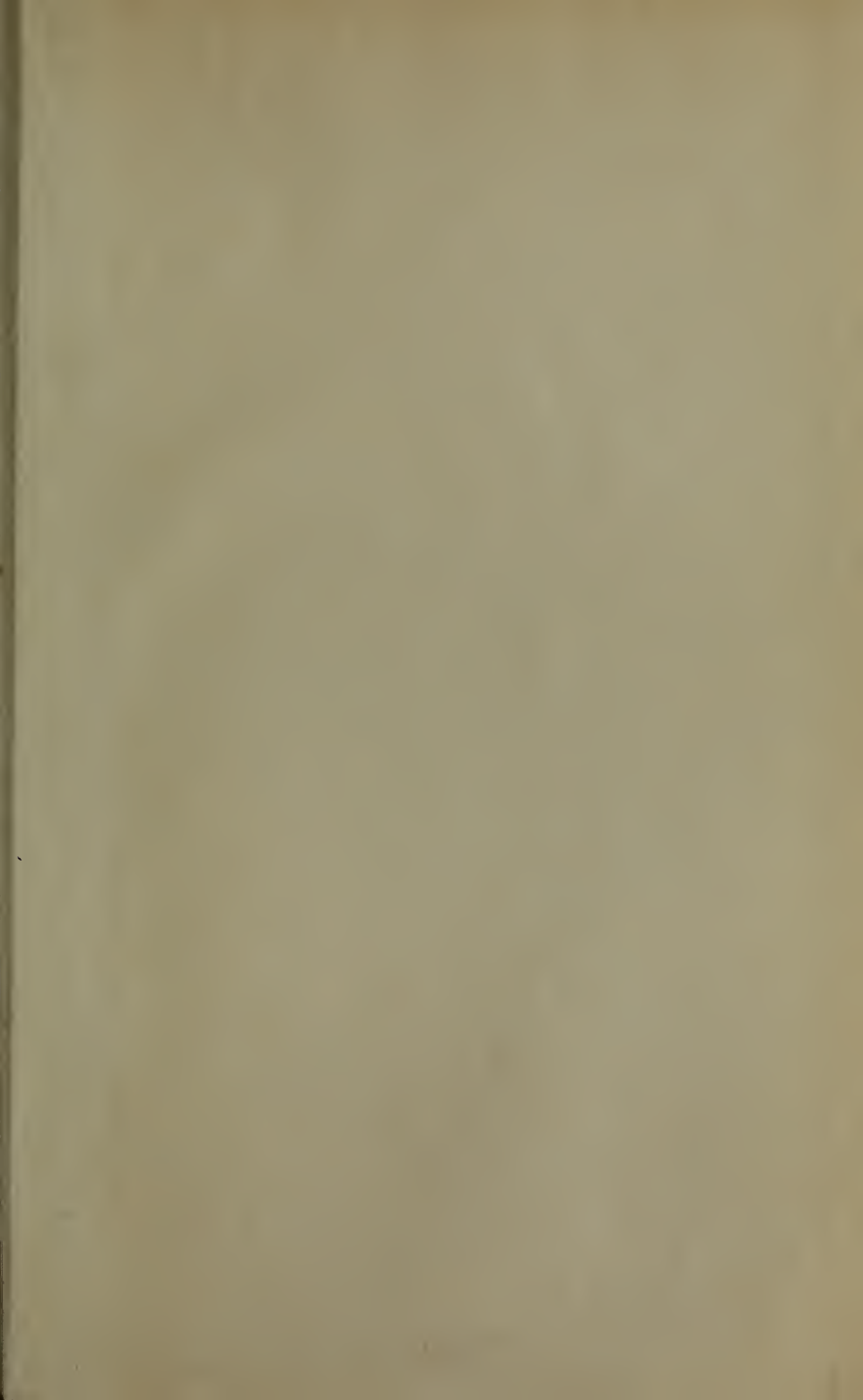
I hereby certify that .....  
the above applicant is duly qualified to pursue with profit the  
work of the Lowell Textile School.

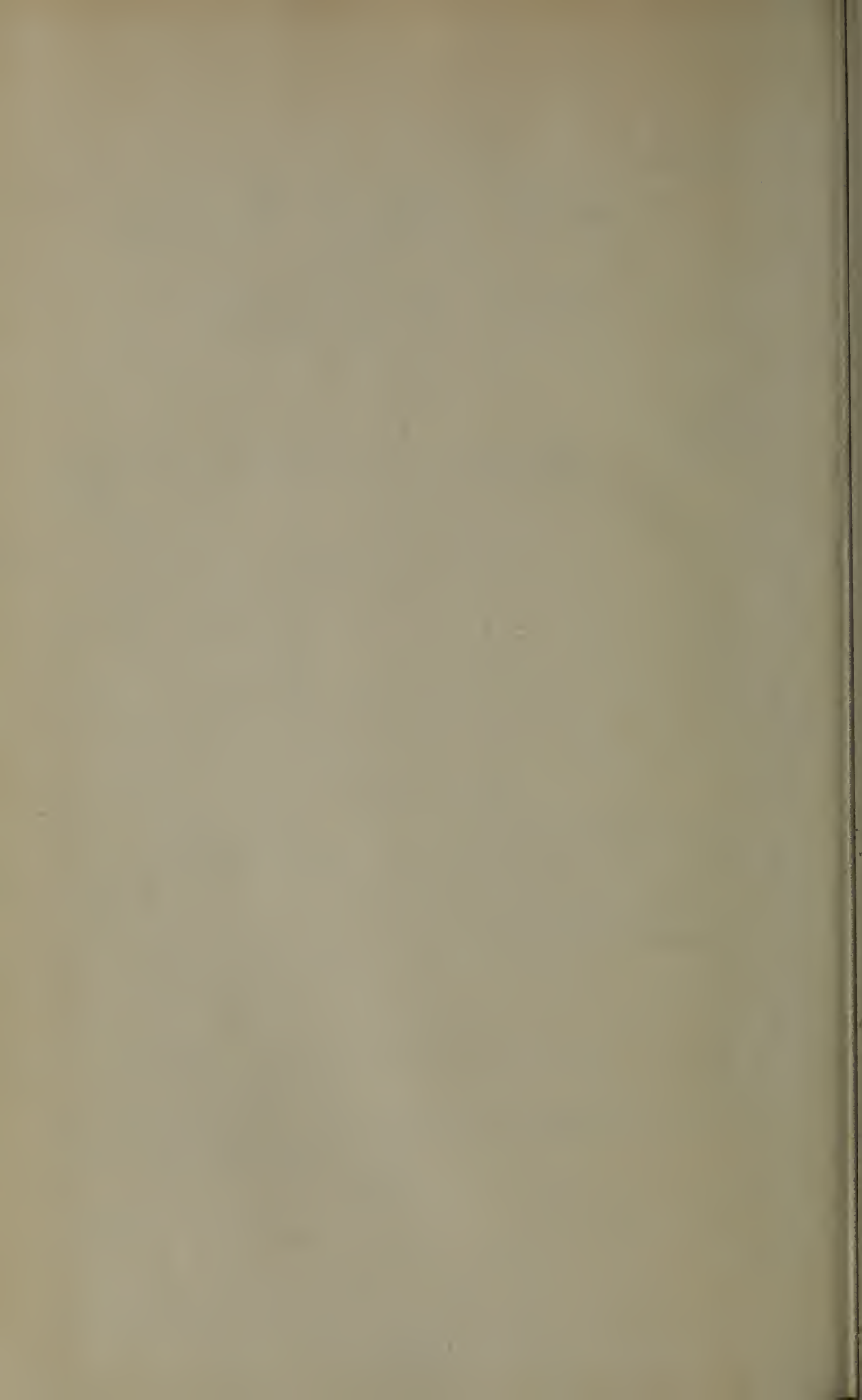
SIGNED : .....

Principal ..... School, located

at ..... State of .....

Date .....







WELLS BINDERY  
WALTHAM, MASS  
DEC. 19. 9



378.05  
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Bulletin of the  
Lowell Textile  
Institute

1905-1908

